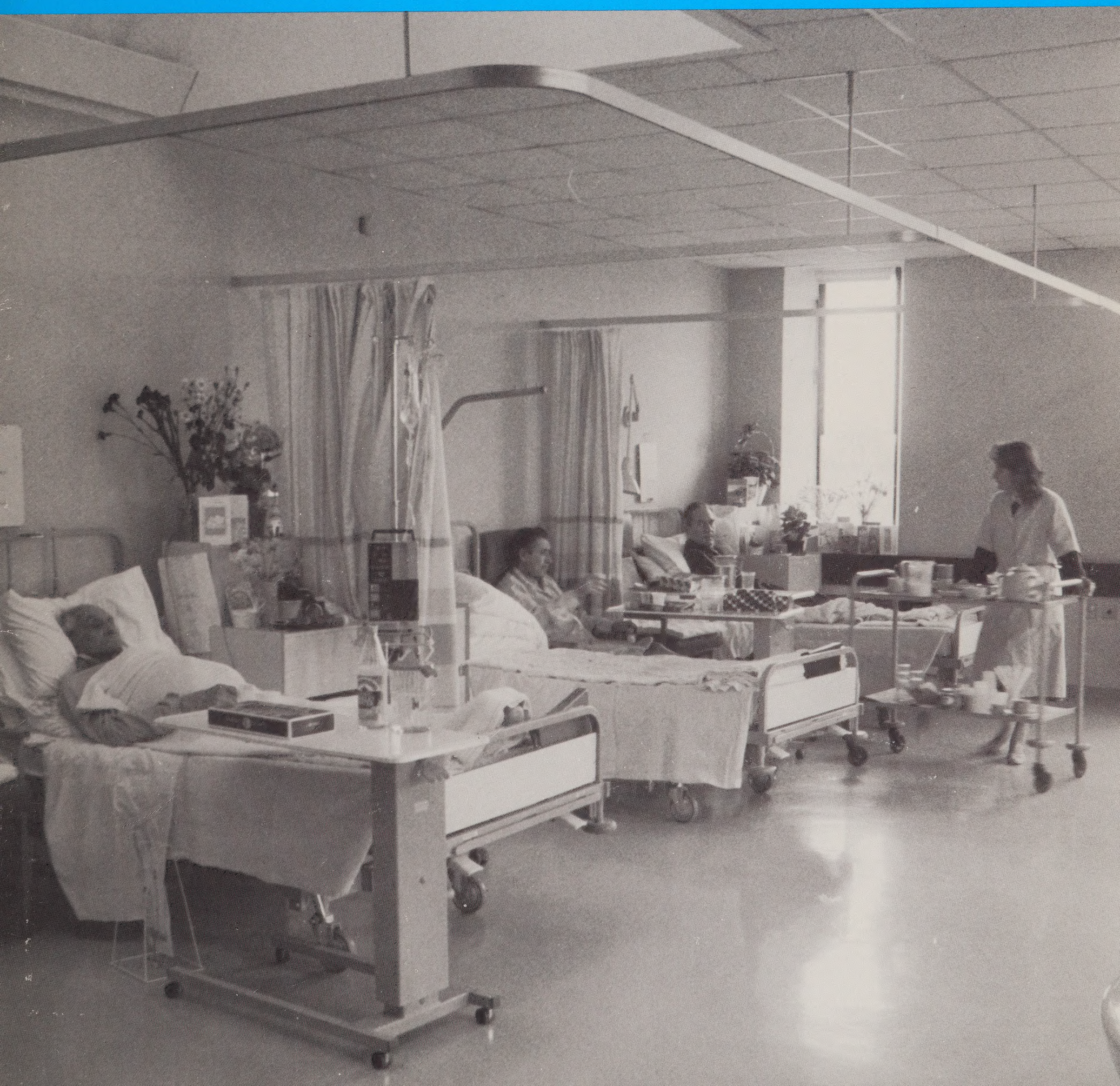
HEALTH BUILDING NOTE

MC0059

4

Adult Acute Wards

DEPARTMENT OF HEALTH
and the WELSH OFFICE



Health Building Notes

Health Building Notes (HBN) are guides for those responsible for the briefing and design stages of schemes for providing new, or adapting or extending existing health buildings. In each HBN the functions, activities, equipment, environmental conditions, engineering services and dimensions which are critical to the efficient performance of an activity are identified and discussed. Alternative solutions and their cost implications are discussed where appropriate. Cost Allowances are based on the standards described in each HBN.

The first three HBNs in the series provide a general review of the planning of health buildings, and should be read by all those who are new to the subject.

HBN1 'Buildings for the Health Service' describes the planning, construction and commissioning of a health building, and introduces the reader to Departmental publications on all aspects of building.

HBN2 'The Whole Hospital' (in preparation) describes the preparation of a brief for a health building and explains how the stages of the process may be related to the mandatory requirements of Capricode.

HBN3 'The Design of the Hospital' (in preparation) deals with the preparation of the development control plan (DCP)—the 'master plan' for the hospital.

In subsequent HBNs in the series, which deal with individual departments, it is assumed that the reader is broadly familiar with the introductory volumes.

Guidance on spaces common to all health buildings is presented in the four volumes which comprise HBN40 'Common Activity Spaces'.

HBNs published by HMSO are usually accompanied by a companion Design Briefing System Notebook. This considerably facilitates the project team's task of translating the guidance in the related Note into a brief for designers. The value, purpose and structure of Design Briefing System Notebooks are described in DBS1 'An Aid to Briefing'.

HBNs are prepared in consultation with representatives of the National Health Service and appropriate professional bodies.

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1 Scope of Health Building Note

Introduction

1.1 This Health Building Note (HBN) provides guidance on accommodation for acutely ill adult patients. It replaces the major part of HBN 4 'Ward Units' (last revised 1968) and HBN 17 'Deep Plan (Race Track) Ward Units' (1963, out of print). Accommodation for adult acute care, previously described in HBN4 (1968) alone, is now covered in two HBN's: the present Note, and a new Note to be prepared — HBN50 'Isolation Ward'.

1.2 The term 'ward' as used in this Note means the accommodation (bedrooms, day spaces, services spaces) for a group of patients normally the responsibility of a named sister/charge nurse; it does not denote any particular layout. To prevent confusion, patients' bed areas are referred to as 'multi-bed rooms' or 'single-bed rooms'.

1.3 The provision, for example, of a seminar room for every ward is unlikely to be justifiable, though nowadays every ward requires the facilities which a seminar room affords. The seminar room, therefore, is classified as 'Essential Complementary Accommodation' (ECA).

1.4 A cook-chill trolley holding space is an example of a space which has a different status; it is only provided when required by the relevant whole hospital policy. It is therefore classified as 'Optional Accommodation and Services' (OAS).

1.5 *The course recommended to planners, therefore, is to regard not the single ward, but a cluster of adjacent wards together with the related ECA and OAS, as a unit.*

1.6 In this Note the traditional term 'ward' is retained for brevity; whether a particular remark refers to a 'ward' or to the unit ('ward cluster') should be apparent from the text.

1.7 Hospital buildings should not only satisfy functional requirements, but should also be economical in respect of both capital and running costs. Due weight must therefore be given to problems of space provision, maintenance, cleaning, energy consumption and staffing requirements.

1.8 Care has been taken to ensure that the guidance and recommendations for the accommodation in this Note are as economical as possible without detriment to clinical standards.

Inclusions

1.9 The information provided can be used to design wards suitable for general medicine and surgery, and also for the following specialties:

cardiology	facial-maxillary surgery
chest diseases	urogenital surgery
dermatology	gynaecology
endocrinology	ophthalmology
gastro-enterology	otorhinolaryngology (ENT)
neurology	reconstructive surgery
oncology	trauma and orthopaedic
rheumatology	urology

Several consultants may have beds in a ward, and a ward may serve more than one specialty.

1.10 The information provided can also be used for the design of:

a. accommodation for patients admitted overnight or for a short stay;

b. radio-therapy and stroke rehabilitation wards. In these cases design, equipment and furnishings should be appropriately varied to ensure a homely atmosphere.

Exclusions

1.11 The following specialties are not covered by this Note:

coronary care	burns
spinal injury	intensive therapy
renal dialysis	neurosurgery
liver medicine	transplant surgery

and isolation — other than that referred to in paragraphs 2.19 and 2.20.

Guidance exists for the accommodation required for:

maternity department	HBN 21 — published 1989
children	HBN 23 — published 1984
people with acute mental illness	HBN 35 — published 1988
elderly people	HBN 37 — published 1981

adult acute day patients	HBN 38 — published 1982
severely mentally handicapped people	Building Evaluation — published 1981 Pamphlet MH2

Revision of existing guidance is in preparation for:

Intensive Therapy Unit	HBN 27

New guidance will be prepared for 'isolation ward' — see paragraphs 2.19 and 2.20.

Design Briefing System (DBS)

1.12 The Design Briefing System is an aid to the preparation of whole hospital and department policies. A DBS Notebook is usually published with each new Health Building Note. The format of DBS is as follows: a portion of the text of the HBN is reproduced on the left hand page, while on the facing right hand page a sequence of options implied by the text is set out in such a way that they may easily be marked for acceptance or rejection. The use of the DBS ensures that, for example:

a. in a sequence of decisions, none is overlooked;

b. additional options may easily be entered, and related to existing options;

c. earlier decisions are identified so that they may be easily recaptured when associated topics are under consideration;

d. during refinement of the brief the implications of modifications which may affect and therefore prompt reconsideration of earlier decisions, may easily be checked;

e. members of the team can review the questions next due for consideration and thus ensure that they are fully informed before the meeting: this has been found to be of great organisational and psychological benefit;

f. members of the team have a clear, up-to-date record of agreed decisions which can easily be identified, as they are free from the mass of minutes which are not of immediate relevance.

1.13 Further information about DBS can be obtained from the Department of Health, Room 503 Euston Tower, 286 Euston Road, London NW1 3DN (tel: 01 388 1188 ext 3590).

Works Guidance Index

1.14 Whilst this Note provides guidance that is current at the time of publication, it must be borne in mind that there are wider considerations associated with medical gases, high risk infectious diseases, fire, energy conservation etc covered by other published guidance which must also be taken into account. Additionally, some aspects of the guidance in this Note may from time to time be amended or qualified and it is necessary for project teams to check with the current edition of the Works Guidance Index. The Index is published by the Department in May each year and updated in September and January. It should be noted that as the Index covers the guidance current in the previous year it carries the previous year's date.

Cost Allowance

1.15 The Cost Allowance associated with this Note is promulgated in an Annex to the Health Notice HN(89)10 — in Wales WHC(89)36, issued with the Advance Copy of the Note.

Capricode

1.16 Capricode is the mandatory procedural framework governing the inception, planning, processing and control of individual health building schemes. The aim is to promote a consistent and streamlined approach to capital development that achieves best use of resources through the selection and construction of relevant and cost effective schemes that open on time and within budget. It identifies the main activities and provides a framework for delegation with effective management and the proper accounting for expenditure and performance. (See 'Capricode Health Building Procedures' issued with HN(86)32 in October 1986 — in Wales WHC(86)62).

Equipment

1.17 Equipment is categorised into four groups:

Group 1: items (including engineering terminal outlets) supplied and fixed within the terms of the building contract;

Group 2: items which have space and/or building construction and/or engineering service requirements and are fixed within the terms of the building contract but supplied under arrangements separate from the building contract;

Group 3: as Group 2 but supplied and fixed (or placed in position) under arrangements separate from the building contract;

Group 4: items supplied under arrangements separate from the building contract, possibly with storage implications but otherwise having no effect on space or engineering service requirements.

1.18 Group 1 items are provided for in the Cost Allowance associated with this Note. The Equipment Cost Allowance Guide (ECAG) provides a sum of money for Groups 2, 3 and 4.

2 General Service Considerations

Purpose

2.1 The accommodation described in this Note provides facilities for the assessment, diagnosis, treatment, nursing care and rehabilitation of acutely ill adults.

Scale of provision

2.2 The total number of in-patients to be treated per year, in each specialty, should be determined by District Health Authorities in the light of current national and local policies. An analysis of the utilisation of existing wards will assist in determining the amount of new accommodation required. This Note does not recommend a particular scale of provision, but included at Appendix 2 is an illustrative methodology for the calculation of Adult Acute Ward requirements in a proposed hospital.

Functional Unit

2.3 *The functional unit is 'the bed'.* A number of beds grouped together (with ancillary spaces) form 'the ward', for which a named ward sister/charge nurse is responsible. The ward size should normally comprise 24 beds, but project teams may vary this according to local needs. No ward should contain more than 28 beds.

2.4 This Note provides a Cost Allowance based on 'the bed' and its proportionate share of ancillary spaces.

User requirements

2.5 The proportion of high dependency patients has increased significantly because of:

a. shorter average lengths of stay;

b. an increase in the proportion of elderly and very elderly patients admitted;

c. advances in medical practice.

Health authorities should consider the consequences for service and design of this increase in throughput and workload; for example, the demand for supplies and equipment, and therefore for storage, has increased and is likely to continue to increase.

The Patient

2.6 Patients require:

a. a bed space;

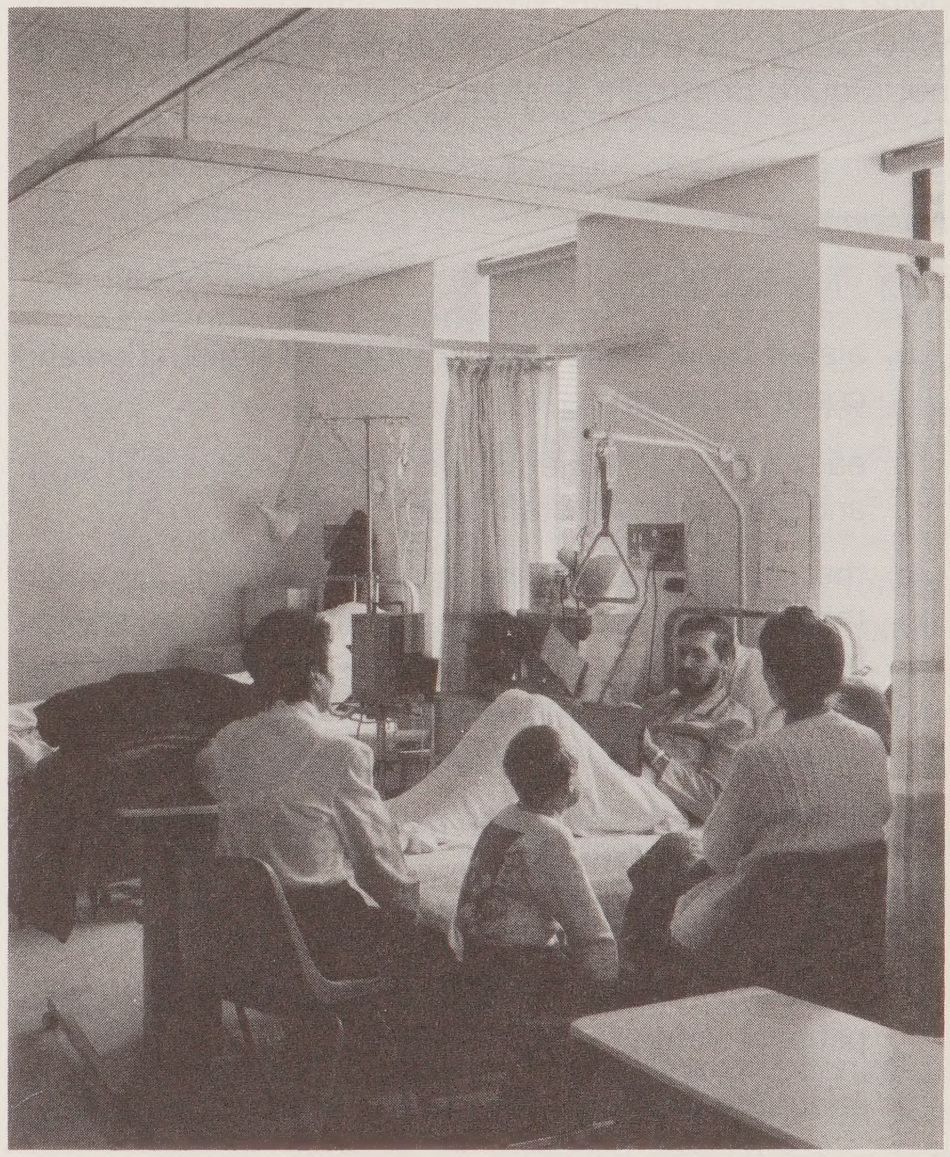
b. facilities for treatment;

c. to see and speak to nurses as they move about the ward;

d. auditory and visual privacy, especially when receiving medical and nursing attention;

e. easy access to bathing, washing and WC facilities from bed and day areas;

f. space around the bed where they or their visitors may sit, for storage of personal belongings, and to manoeuvre and use a walking frame or wheelchair;



The bed space — relatives visit a patient at the bedside

g. the means to summon attention;

h. amenities, including radio and television, an individual bed-light, access to a telephone, and a change of environment, for example, day spaces;

j. to be free from noise;

k. to be free from unpleasant odours;

m. a light, pleasant and calm environment.

2.7 Mixed sex wards may have therapeutic, organisational and economic advantages. Some patients may find

the idea embarrassing and distasteful; *it is essential to ensure that patients' privacy and dignity are not impaired.*

2.8 A mixed sex ward can be utilised more flexibly and intensively than a ward designed for use by one sex only. A ward designed for use by both sexes can be used by one sex, but the converse is not necessarily true; for example, the location of sanitary facilities may be unsuitable for mixed sex ward use.

2.9 Current practice favours a ward with some multi-bed and some single-bed rooms. It is for project teams to decide the exact mix of rooms to be provided, but the multi-bed rooms should normally contain six beds — for use either by male or female patients as appropriate. There should be at least four single rooms.

2.10 All bed spaces should be suitable for high dependency patients.

2.11 Single-bed rooms may be used to nurse very ill or dying patients, patients who are confused, and patients who cannot be treated in a multi-bed room but who do not require treatment in strict isolation.

Nursing staff

2.12 Nurses require:

a. a staff base — the focal point for administration and communication;

b. easy access to patients, with most beds within sight and sound of the staff base;

c. that the bed space in single-bed rooms, or within the curtained bed space in a multi-bed room, should be sufficient to accommodate a variable height bed with tilt mechanisms and attachments, and to attend a patient in privacy;

d. short distances between patient areas and supporting service rooms;

e. facilities for clinical hand-washing;

f. sufficient space in sanitary facilities to assist patients safely;

g. adequate storage spaces, near to points of use;

h. facilities to locate and summon staff in an emergency;

j. facilities for clinical teaching;

k. facilities for confidential interviews;

m. facilities for confidential telephone conversations;

n. secure storage for personal items while on duty.

Medical staff

2.13 Doctors require:

a. sufficient space and illumination to examine and treat patients within their bed space, or in a treatment room, with the requisite auditory and visual privacy;

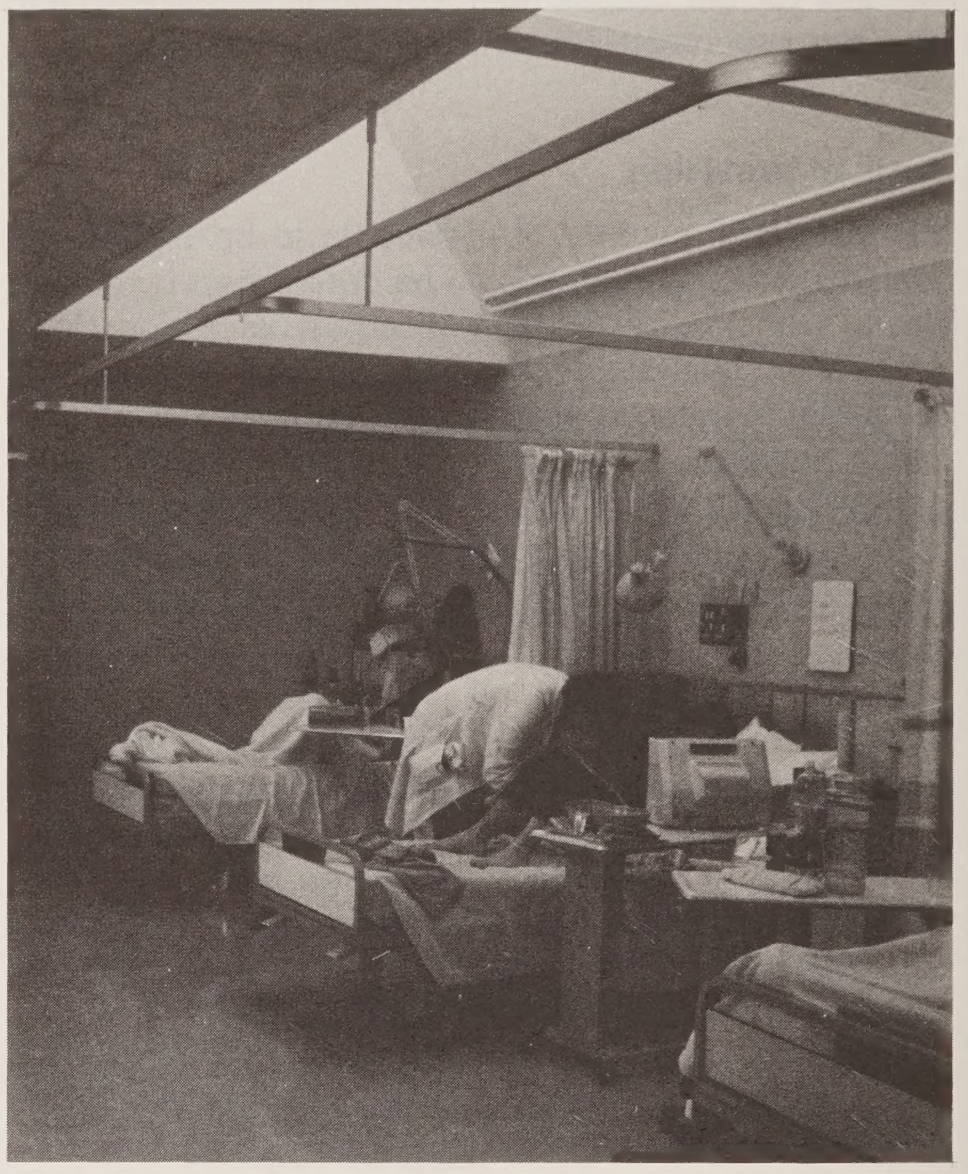
b. sufficient space in single-bed rooms to examine and treat patients;

c. facilities for clinical hand-washing;

d. space to read and write clinical notes and reports, and view x-ray films;

e. facilities for clinical teaching;

f. facilities for confidential interviews.



A doctor carries out a clinical examination at the bedside

The wards of a teaching hospital will require additional facilities for undergraduate medical education. (See paragraph 2.16).

Rehabilitation

2.14 This Note assumes that any rehabilitation undertaken in the ward, for example, physiotherapy and occupational therapy will take place primarily:

a. at or near the bedside;

b. in the day room of the ward;

c. when traffic permits, within the main circulation routes.

HBN8 'Rehabilitation: Accommodation for physiotherapy, occupational therapy and speech therapy' (in preparation) provides for an area of optional accommodation which may be shared between wards. This should be located near to wards. Patients may attend the department of rehabilitation for specific treatment.

Visitors

2.15 Visiting times are a matter for local decision. Open visiting requires waiting space away from bed rooms where visitors can sit comfortably whilst a patient is resting or receiving medical or nursing attention. Accommodation near to the ward may be required for the relatives of a patient who is seriously ill. The possibility that relatives may be elderly, disabled, or both, should be borne in mind.

Clinical teaching

2.16 Seminar facilities, at ward level or for a ward cluster, in which clinical instruction and case discussion may take place, are required. If it has been agreed that the teaching of undergraduate medical students will take place in the accommodation, and their numbers necessitate additional space, reference should be made to the document 'Teaching hospital space requirements' issued March 1974, DS 65/74, and Welsh Office's letter HSD 3/57/1 dated 28 April 1974.

2.17 Postgraduate/medical education requiring special facilities should take place — in a postgraduate medical education centre or in the hospital education centre.

2.18 The requirements of students in professions supplementary to medicine should be considered, and the appropriate people and/or professional bodies should be consulted at the initial planning stage.

Control of infection

2.19 At least two single bedrooms should be provided with en-suite shower and wc. These may be used for patients whose condition cannot be treated within a multi-bed room but which does not require strict isolation.

2.20 Isolation facilities requiring sophisticated environmental controls should not be provided in normal adult acute wards. Special environmental services such as controlled reversible airflow/ventilation, and skilled nursing staff should be provided in a separate Isolation Ward. Guidance for this ward will be provided in a separate Health Building Note (to be prepared). The Isolation Ward will attract its own Cost Allowance.

Ward administration

2.21 Junior medical staff and sister/charge nurse require office accommodation in the ward. Care should be taken to avoid any unnecessary duplication of offices.

Whole hospital policies

2.22 Operational policies for each ward should accord with whole hospital policies and interrelate with those of other wards and clinical departments.

2.23 The following subjects which are determined by whole hospital policies are discussed in this section:

a. Catering;
b. Domestic services;
c. Supplies, storage and disposal;
d. Health records;
e. Staff changing;
f. Treatment Room facilities;
g. Space sharing.

Catering

2.24 Each ward must have facilities for serving meals to patients. Two common methods of meal delivery service are:

a. **central tray service** — meals which have been assembled to the individual patient's requirements are delivered to the ward in a trolley: food is kept hot by a heat retaining base under each plate. On arrival at the ward meals are served at the earliest opportunity. Space should be provided to accommodate the delivery trolley without obstructing normal circulation.

b. **cook-chill service** — chilled meals which have been assembled to the individual patient's requirements are delivered to the ward in a trolley. This may incorporate a reheating compartment, or a separate reheating unit may be provided at ward level or in a shared trolley holding room. Meals must be heated under controlled conditions before being served to patients. Space, in addition to that needed for the bulky delivery trolleys, must be provided for activities associated with the controlled re-heating process — for example temperature monitoring. An electric power supply will be needed.

Health authorities must, in determining the choice of supply, identify the implications (including statutory requirements — see paragraph 5.2) of the system selected for provision at ward level.

2.25 A ward pantry is provided for the preparation of beverages and light snacks and storage of dry foods, milk and a limited amount of crockery and cutlery. It is expected that patients' water jugs and glasses will be washed, dried and refilled within the pantry.

Domestic services

2.26 The accommodation required for storage and cleaning of equipment at ward level will be determined by the scope and extent of the service as outlined by the whole hospital policy. The scope for sharing this accommodation between wards should be explored by project teams.

2.27 The type and number of items of equipment and materials to be stored will depend upon the finishes

provided in the accommodation, numbers and deployment of staff and the frequency of cleaning. The efficiency of cleaning services will be assisted by restricting the variety of floor finishes; the backing of textile floor coverings should be impervious to fluids, and the pile non-absorbent.

2.28 The cleaning properties of wall and ceiling finishes should be taken into account when coverings are selected.

Supplies, storage and disposal

2.29 The storage space required for supplies is influenced by three principal factors:

a. **Type**: medical surgical sundries, sterile supply service items, pharmaceutical supply, etc;

b. **Quantity**: proportional to patient throughput;

c. **Policy**: the whole hospital policy determines the frequency of delivery of each type of supply.

2.30 The space provided should be sufficient to hold that quantity of each item which will match the expected demand for the longest period of time between consecutive deliveries. In practice this means holding not less than five days supply.

2.31 The consequences of supply, storage and disposal policies for capital, revenue and service all interact. Increasing space and stock increases both capital and revenue costs. Reducing space reduces capital outlay but demands an increase in the frequency of delivery, so that running costs also increase. Insufficient stock can adversely affect patient care and nursing service because staff are distracted by the necessity of seeking or collecting the items required. Also, an unreliable supply encourages defensive overstocking.

2.32 Disposal of pressurised containers requires special attention — see SAB(88)79 'LPG Aerosol Containers: Risks arising from storage, use and disposal'. Specifically constructed containers (see Specification No TSS/S 330, 15 December 1982) should be used for 'SHARPS' particularly needles. This minimises the risk of injury to staff, particularly portering staff, handling goods destined for incineration.

Health records

2.33 Policy for the administration of health records is often determined at district, or even regional, level. Efficient management and budgetary control requires complete and accurate data for local and national statistics. On the clinical side, the demand for accurate and timely pathological data, and the requirements, for example, of multi-centred clinical trials, lend the health record increasing importance. With these points in mind, particular attention has been paid in this Note to the organisation of the staff base, the requirements of automatic data processing, and office accommodation.

Staff changing

2.34 Changing facilities for male and female staff may be provided centrally, zonally, or locally (see HBN 41, 'Accommodation for Staff Changing and Storage of Uniforms' Nucleus Study No 12 'Staff Change (Options)' and Nucleus Study 13 'Decentralised-zonal staff change'). Ward facilities should complement those provided elsewhere.

Treatment room facilities

2.35 A treatment room is intended to accommodate clinical procedures which should not be performed at the bedside except when the patient is too ill to be moved, or when it is acceptable to undertake such procedures for a patient located in a single room. Project teams should decide whether they prefer to provide:

a. each ward with a treatment room which may also be used for patient examination and consultation;

b. a central suite of treatment rooms in association with an Adult Acute Day Care Unit, to which all wards send their patients.

Space sharing

2.36 It is sometimes possible to share spaces between wards, and thus reduce the total space requirement. The following spaces have been shared: day rooms, seminar room; staff changing; cleaner's room; and disposal room. However, sharing space, although undoubtedly economical, has not always been a success. For example, the sharing of the ward treatment room and ward pantry has not, in practice, been successful.

3 General Functional and Design Requirements

3.1 This Chapter provides design guidance based on the service objectives outlined in Chapter 2, and also includes information on a range of topics and environmental matters which should be taken into account when designing wards.

Location

3.2 Adult acute wards are the largest single element in a district general hospital, constituting about a quarter of the total floor area. Their design, grouping and relationships with diagnostic, treatment and service departments are major influences on the form of the whole hospital. Surgical wards should have easy access, preferably on the same floor, to operating theatres and the intensive therapy unit; medical wards should be within easy reach of diagnostic and treatment facilities. The likelihood of eventual change of use of wards should also be borne in mind.

3.3 There are advantages in grouping wards together in a 'ward cluster'; for example, there are economic advantages in sharing accommodation. Also management can be made easier and more responsive to changing needs.

3.4 Because the size and shape selected for a department can influence its location within the hospital, the building shape of the ward should not be restrictive: it should permit the construction of a variety of clinical departments above or below.

Internal spaces

3.5 Internal rooms may contribute to economy in planning, but because they require artificial lighting and mechanical ventilation, capital and running costs are increased. Such rooms should be reserved for activities which demand a controlled environment; or for rooms which, though in constant use, are used intermittently by different individuals. Rooms that are likely to be occupied for any length of time by patients need natural light. Project teams will need to decide which areas used solely or mainly by staff can be placed in internal rooms, taking into account local usage.

Design features

3.6 Patients' physical limitations impose special demands on internal design and fittings. Reference should be made to HBN 40 'Common Activity Spaces'. Authorities are reminded of the need to comply with the provisions of the Chronically Sick and Disabled Persons Act 1970 as amended by the Chronically Sick and Disabled Persons (Amendment) Act 1976, the Disabled Persons Act 1981, and The Building (Disabled People) Regulations 1987. Attention is also drawn to BS 5810: 1979 'Access for the Disabled to Buildings' (under review). One of the effects of the 1981 Act is to apply this British Standard to premises covered by the 1970 Act, which includes those open to the public. Practical guidance for complying with The Building (Disabled People) Regulations is issued by the Department of the Environment under Approved Document M: Access for the Disabled.

3.7 Doorways should be wide enough to allow clearance for people using walking aids and for wheelchairs. In some parts of the ward door openings must be wide enough and high enough to allow the passage of beds and attached equipment, for example orthopaedic attachments and drip poles. Lever handles if fitted should be 900 mm above floor level. When glazed doors are provided, the size and height of the glass panels should be appropriate to requirements for visibility and privacy. Fire regulations may require that electro-magnetic door retainers be fitted; floor-mounted retainers should not obstruct traffic, In an emergency it must be possible to gain access to occupied WC cubicles from the outside (See SIB(85) 60). Doors should be fitted with easigrip bolt handles. Bi-fold doors are not suitable.

3.8 Reference should be made to HTM 58 'Internal Door Sets' and HTM 59 'Ironmongery' for information on suitable components and for further guidance.

3.9 Other features requiring special consideration:

a. washbasins should be strongly fixed so that they can be used by patients for support; be located at a suitable height for ease of access by patients seated in a chair or wheelchair; and should not be supported by legs. Short-lever action taps are more easily used by patients. (See HTM64 'Sanitary Assemblies');

b. mirrors and shelves should be fixed at heights suitable for both wheelchair and standing users. Shelves should be placed near mirrors, but neither should be placed over basins;

c. aids for lifting and moving patients must be compatible with other equipment. Space in the treatment room, bathroom and bed areas must be sufficient to allow effective use and easy manoeuvre of aids for lifting and moving patients.

Safety

3.10 The provision of a safe environment for both patients and staff is essential. Special attention should be given to:

a. **Patient safety**

   (i) Window opening restrictors should be fitted;

   (ii) Handrails should be provided on long runs of wall in circulation areas and, where required, in sanitary accommodation;

   (iii) Floors should be, and look, slip resistant and non-reflective.

b. **Staff safety**
   Back injury related to patient handling is a major problem causing much suffering and, ultimately, the loss of staff who leave the Health Service with permanent disability. In most old, and many newer buildings, there is insufficient space for the safe handling of patients. Spaces in rooms, corridors and door openings should be large enough to permit staff effectively to use mobile hoists and other aids.

Fire safety

3.11 It is essential that project teams familiarise themselves with the guidance in the FIRECODE series of documents which contain the Department's policy and technical guidance on fire precautions in hospitals and other NHS premises. In particular, the need for structural fire precautions and means of escape from the whole accommodation must be taken into account at the earliest possible planning stage. The key document for these aspects in hospitals is Health Technical Memorandum (HTM) 81 — 'FIRECODE: Fire precautions in new hospitals'

3.12 In addition, basic policy, principles and key management guidance are contained in 'FIRECODE: Policy and principles' . Other FIRECODE documents include the HTM '80' series (which give technical guidance on various building, engineering and equipment issues), the 'Fire Practice Notes' series (dealing with specialist aspects of fire precautions) and Nucleus guidance. Existing HTMs will, in due course, be reissued in the FIRECODE format. The series includes 'FIRECODE: Directory of fire documents' which lists references to relevant legislation and relevant fire precautions guidance issued by DoH and other sources, for example, the Home Office.

3.13 It is important to establish during the design stage those aspects of fire safety strategy which affect the design, configuration and structure of a project. At appropriate stages of the design process the architect and engineer should discuss and verify their proposals with the local fire authority, and ensure that the project team and all other planning staff are fully acquainted with the fire safety strategy for the design in terms of operation (staff responsibilities etc), equipment provision, and buildings and engineering layouts. Health Technical Memoranda 56, 57, 58, 59, 60 and 65 give detailed information on the selection of fire resisting components and fire signs.

3.14 The principles of fire safety apply equally to new projects and to alterations and upgrading of existing buildings.

Security

3.15 Assaults on hospital staff and theft of NHS property are recognised problems. The project team should discuss security with the officer in charge of the local Police Crime Prevention Department and the hospital or district security officer or adviser at an early stage in the design of the building. Fire and Security Officers should be consulted concurrently because the demands of security and fire safety may sometimes conflict. The attention of planners is drawn to circular HN(84)26 dated December 1984 — in Wales circular WHN(85)1, and the NHS Security Manual issued with the circular.

Internal environmental considerations

3.16 This section enlarges upon general environmental considerations; particular aspects are dealt with in Chapter 6.

Natural and artificial lighting

3.17 The design of windows must reconcile different needs. In addition to the various statutory requirements, the following aspects also require consideration:

a. illumination and ventilation;

b. insulation against noise;

c. thermal loss or solar gain (see 'Low Energy Hospital Study Report' Volume 2, Section D)

d. the prevention of glare;

e. the provision of a visual link with the outside world.

3.18 Design should ensure that it is possible for cleaners to have easy access to the inside and outside of windows. Guidance on types of window and on the safety aspects is available in HTM 55 'Windows'.

3.19 Where windows are located in the wall behind the bed-heads it is necessary to ensure that the space requirements for beds, lockers, bed-head services, etc are not compromised to the disadvantage of either patients or staff.

3.20 Decor should be light and pleasant. Natural lighting is essential to the well-being of patients. The provision of a comprehensive artificial lighting installation is also essential; it makes an important contribution to the aesthetic appeal of the ward. It should be possible to vary the level of illumination to suit functional activities. Task

lighting of the required intensity with low-contrast glare-free background illumination should be provided. All lighting in the ward should have suitable colour rendering characteristics.

3.21 Orientation is an important consideration in any site development scheme. Sunlight enhances colour and shape and helps to make a room bright and cheerful. Glare can be reduced by attention to the detail of window design, and can be controlled by curtains or blinds. The harmful effects of undesired solar gain can be mitigated by external screens — a costly solution — or by architectural detail of the shape of windows and depth of reveals. Properly controlled solar gain contributes to energy efficiency.

Courtyards

3.22 Well proportioned courtyards enable more rooms to receive natural daylight and ventilation, and can provide a stimulating outlook from patients' bedrooms and dayrooms and from staff areas, and thus compensate for the lack of a longer view. Suitable layout and planting can help to preserve privacy in surrounding rooms.

3.23 It is desirable to provide access to courtyards from day rooms or corridors wherever possible; thresholds should be designed to facilitate the movement of people in wheelchairs and those who have difficulty in walking. Seating should be provided. Access for maintenance should be from a hospital street or other corridor so that patients and staff are not disturbed.

3.24 Reference should be made to HBN 45 'External Works for Health Buildings' (in preparation) for more detailed guidance on this subject.

Ventilation

3.25 Natural ventilation is usually caused by the effect of wind pressure. It will also occur to some extent if there is a temperature difference between the inside and the outside of the building. This thermo-convective effect frequently predominates when the wind speed is low and will be enhanced if there is a difference in height between inlet and outlet openings. Ventilation induced by wind pressure can promote high air change rates through a building if air is able to move freely within the space from the windward to the leeward side of the building.

3.26 Internal partitions, fire compartment walls and closed doorways can however often impede the flow path, and when this happens the process will be more dependent on single-sided ventilation. Nevertheless, even with this degree of obstruction to air movement, acceptable ventilation may still be obtained without window openings which would prejudice safety, security or comfort. Some types of windows, for example vertical sliding, can enhance single-sided air exchange by temperature difference, and these will improve the overall rate of natural ventilation in protected or sheltered areas where the effect of wind pressure is likely to be minimal. Section 2.3 of HTM 55 'Windows', BS5925 — 'Code of practice for Design of buildings' and CIBSE Symposium 'Natural Ventilation by Design (2.12.80)' provide further information.

Heating

3.27 Space heating should be designed for continuous operation and should be available during the summer months for use on cold days and nights. Heat emitters should be free of sharp edges and should be easy to clean. Emitters should not create an obstruction and should not be located behind beds.

Noise

3.28 Any unwanted sound is a noise. Careful consideration should be given to ensuring a quiet environment for patients. Sound, for example from the pantry or the dirty utility room, should be isolated and absorbed at source, where possible, with acoustic materials; it should be reflected and reduced by the use of soft floor coverings, curtains and other materials. On the other hand, a ward can be too quiet; indeed a low level of background sound can assist privacy.

3.29 Adequate auditory privacy in offices and treatment rooms must be ensured. Telephones, especially at the staff base, need special consideration both in respect of noise and auditory privacy. The installation should permit the transfer of calls from the staff base to some more private location. TV and radio sound should only be transmitted through earphones.

Provision for automatic data processing (ADP)

3.30 Information technology has a central role in health management. The use of computers and telecommunications — and, indeed the rate of technological innovation — continues to increase. The implications for project teams are threefold: firstly, a requirement for the housing of the computers; secondly, a requirement for the provision of ducts for transmission cabling; and thirdly, sufficient space and adequate power supplies for modems, visual display units and printers, and associated software and stationery. Even if the introduction of automatic data processing is not proposed at the time that the project team completes its brief it will be advisable to design in such a way that equipment can be introduced easily and quickly at some later date.

3.31 There are two principal matters of concern: visibility, and noise. Visual display units (VDUs) are now a familiar sight, and it will easily be appreciated that they cannot be reduced beyond a certain size. Consequently, sufficient and convenient space must be provided for them; also, since the brightness of the letters displayed on the screen cannot exceed a certain limit, special

attention must be given to the ambient lighting to ensure that the contents of the screen are legible. Additional space will be required in front of the screen for a keyboard. Printers are often noisy. Noise may not be too noticeable in wards during normal working hours but during quiet hours it will probably not be acceptable. If it is not possible to position a printer at a site remote from patient areas, expenditure on a quieter printer or on means of quietening a noisy printer can be justified. (See also paragraph 4.23 — Staff base).

3.32 Computer expertise is now widely available in the NHS and project teams should ensure that, at an early stage, they inform themselves concerning current and projected local computing policies, and that their proposals conform with them.

Fittings and finishes

3.33 Designers should aim to create an interior which is comfortable and pleasant to look at. The choice of fittings and furniture should form an integral part of the designing process and should be coordinated within the overall design scheme. Fixtures, fittings and furniture with sharp corners are a common cause of injury and should be avoided.

3.34 Finishes, including floor coverings in day areas (see the Report of the Floor Covering Study Group issued with HN(78)32 (WHN(78)92 in Wales)) should be functional and be compatible with the need for comfort, cleanliness and safety.

3.35 The quality of finishes should, in general, conform with the standard of finishes specified for the rest of the hospital. Cleaning regimes should be considered when materials are selected.

3.36 The likely occurrence and effects of accidental damage in the ward should be considered. Damage in health buildings has increased over the years due to the use of heavier mechanical equipment for the movement of patients and supplies and, to some extent, as a result of using lightweight, often less robust, building materials. Most damage to doors and to floor and wall surfaces is caused by wheeled traffic. Protective corners, buffers and plates, and soundly constructed floors, minimise damage. Protective devices should be capable of being renewed as need arises. Reference should be made to the relevant British Standards, to the advice in the Department's DS (Supply) letter 42/75 dated 5 August 1975 on the buffering of movable equipment, and to the guidance contained in HBN 40 Vol 2 'Corridors'. Further information is provided in Health Technical Memoranda 56 'Partitions', 58 'Internal doorsets' and 61 'Flooring'.

Signposting

3.37 HBN 40 Vol 2 'Corridors', and the Health Signs Manual issued in November 1984 as Health Technical Memorandum No 65, should be consulted for general guidance.

Colours

3.38 Colour can influence the morale of patients and staff; and can be used to help patients to orientate themselves and to recognise particular rooms more quickly; thus, for example, all WC doors could be painted the same colour. The overall tone should be light with some stronger accents. Most people prefer light, middle range colours to dark ones. Accurate assessment of the colour of a patient's skin is of clinical importance; surface colours should not distort the colour rendering of light sources. The choice of colours also affects the lighting design and for this reason recommended surface reflectancies are included in Activity Database A-sheets.

Floors

3.39 Floor coverings should contribute to the creation of an attractive environment, but should not present a hazard to disabled people or restrict the movement of wheeled equipment. It is important that the floor covering chosen can be effectively cleaned, maintained and repaired without disrupting the management of the ward. Rapid developments in soft floor covering technology have produced a wide variety of new materials. (See report of the Floor Covering Study Group issued to Health Authorities with HM(78)32 — WHN(78)92 in Wales, and HTM 61 'Flooring'). Floors should not be, nor appear to be slippery and the patterning should not induce disorientation. Changes of floor level should be avoided wherever possible. Surface drag, static electricity, flammability, infection hazards and impermiability to fluids are other factors which should be considered.

4 Specific Functional and Design Requirements

4.1 This Chapter describes the rooms and spaces which together comprise a ward in which the principles described in Chapter 2 may be practised.

Bed spaces

4.2 Each ward should have at least four single-bed rooms. The remainder of the beds will be in multi-bed rooms.

4.3 Each bed space should be provided with:

a. a variable-height bed, a bedside locker (or locker wardrobe), overbed table, an easy chair and space for an additional stacking chair;

b. a bed head luminaire;

c. a bedhead services panel incorporating:
electrical socket outlets;
luminaire control switch;
nurse call reset button/indicator lamp;
staff/staff emergency pull switch;
socket for patient handset;
patient handset storage bracket;
radio/TV stethoscope headset outlet (may be on handset control unit);

d. patient handset control unit incorporating:
nurse call button;
reassurance light;
luminaire switch;
radio/TV volume control knob;
radio/TV selector switch;

e. oxygen and vacuum outlets.

Single-bed rooms

4.4 All single-bed rooms should be provided with:

The single bedroom: a patient relaxes in privacy

a. personal washing facilities suitable for a seated patient;

b. clinical hand-washing facilities;

c. doors.

4.5 At least two of the single rooms should have an en-suite WC and shower; the WC should accommodate a patient on a sanitary chair.

4.6 At least two of the single rooms, but not necessarily those with en-suite facilities, should be near the staff base.

Multi-bed rooms

4.7 Each bedspace should not be less than 2.9m × 2.5m and be separable by curtains to provide a degree of privacy. Curtains should be shadow-proof, flame retardant, and, if suspended from ceiling track, have a net or scalloped inset heading to ensure ventilation and light when drawn. Particular attention should be paid to the location of windows in relation to beds. Windows placed between beds should be so located that patients do not suffer from draughts. Lower floor and upper floor window areas should be the same, except where the upper floor is provided with clerestory or roof lights, in which case the window area may be proportionately reduced. (See Low Energy Hospital Study and Nucleus Study No 18.) Solar gain, down-draught, leaks and the noise of rain are problems commonly associated with roof lights, but all these are soluble. Wardrobes should be so placed that they do not block the light or view.

4.8 Each multi-bed room should include a day area to encourage patient mobilisation over a short distance.

4.9 Project teams should decide in consultation with the local fire authority whether multi-bedrooms should or should not be fitted with doors for fire safety reasons, for example, to limit the spread of smoke. Doors reduce disturbance from noise and increase privacy, which is especially important if the ward accommodates both sexes. On the other hand, observation is reduced and movement of patients and staff is hampered when doors are closed. If the local fire authority advise that doors are not necessary and it is decided not to include them, then the design of the entrance should be such that it is possible to fit doors later without affecting the use of space on each side.

The multi-bed room: there should be a comfortable and spacious environment

Day spaces

4.10 Each multi-bed room should include a day area, as the majority of patients, although highly dependent, are encouraged to sit out of bed for large parts of the day, including mealtimes. A small separate day room should be provided for those few ambulant patients who may be well enough to benefit from a change of environment; for visitors to wait; and where patients may await admission or collection on discharge. Where wards are paired and day rooms are adjacent, one of the two day rooms may be designated as a shared patients' smoking area — see also paragraph 5.3. Patients should be able to see out of a window when seated.

4.11 The day room should provide a warm, cheerful, comfortable and relaxed environment. Space should be sufficient to accommodate wheelchairs and patients using walking aids. A day room, even if it is of sufficient size, cannot be homely if its proportions are unsatisfactory. For some activities, such as watching TV or playing cards, it is necessary to group some chairs while others remain accessible; this is not possible, for example, in a long narrow room.

Sanitary facilities

4.12 Easy access, convenient location and good design of WCs and other sanitary facilities (see HTM64 'Sanitary Assemblies') are of great importance to patients, for all these assist their early mobilisation. WCs should be clearly identified. (See HTM 65 'Signs')

4.13 The temperature at which hot water is delivered from sanitary appliance outlets is particularly important and attention is drawn to 'safety' on Activity Data A-sheets — see Chapter 8.

WCs

4.14 WCs may be located centrally, or may be associated with bedrooms. The latter arrangement has obvious advantages when a ward accommodates both sexes; also, the average distance from bed to WC is likely to be shorter. In some cases central provision may be more economic.

4.15 Centrally located WCs should not be more than about 12m from bed areas or the day room. The following points should also be taken into account:

a. all WCs must have provision for handwashing;

b. as patients may wish to use the WC before or after bathing or showering, a WC and handbasin should be installed in each bathroom/shower room;

c. at least one assisted WC should be so designed that staff can assist the patient from either or both sides. A member of staff must be able to leave the WC without exposing the patient to view, and if privacy cannot be ensured by room design then an internal curtain or screen must be fitted.

Bidet

4.16 Provision of a bidet in the assisted bathroom or assisted shower should be considered; additional bidets may be required in wards serving particular clinical specialties.

Bathrooms and shower rooms

4.17 The number and location of baths and showers within the ward is a decision for project teams, *but patients should have a choice of bath or shower*. Where a bath or shower is provided en-suite to each multi-bed room, no additional bathing facilities, other than an assisted bathroom and assisted shower should be required. To meet the needs of certain patients the assisted bathroom can be used for some treatments.

4.18 Shower rooms, like bathrooms, are of two kinds, one suitable for ambulant independent patients, and the other for semi-ambulant patients using wheelchair or sanitary chair, and requiring assistance.

4.19 Critical dimensions of a shower room with WC and wash basin suitable for ambulant patients (including those who may require minimal assistance) and for patients using walking aids or a wheelchair are included in Appendix 1.

4.20 Patients using an assisted bathroom may arrive in a wheelchair or on a mobile hoist. Staff assist the patient in bathing and associated activities, and may also administer treatments. For the reasons reviewed in paragraph 3.10 (b), a variable height peninsular bath is essential. Space must be sufficient to accommodate three staff, and permit the manoeuvring of support equipment such as a hoist. The room should also contain a WC, hand basin, and possibly a bidet.

4.21 The cord of the patient nurse call system should be easily identifiable, accessible from the wet area, and descend far enough to be within the reach of a patient who has fallen or collapsed. The floor surface should be slip-resistant. The gradient of the floor of the wet area should ensure effective drainage to the waste outlet thereby preventing ponding.

4.22 Ventilation should preclude excessive heat and humidity.

Offices

Staff base

4.23 The staff base is the administrative and communication centre of the ward. When locating the staff base the following points should be taken into account:

a. staff in its vicinity should be able to see and hear the majority of the patients;

b. entry to the ward should be controllable;

c. it should be near utility rooms, and in particular the clean utility room should be in direct view;

A visitor to the ward makes enquiries at the staff base

d. the indicator lights of both the call system and of the Controlled Drugs cupboard should be in direct view;
e. the fire hose reel and isolating valves for medical gases/vacuum should be nearby.

4.24 Activities include the exchange of information orally — both directly and by telephone — and through computer terminals, together with the written work associated with patient care, treatment, and ward management. The use of computers in ward management, and in developing nursing care plans for patients is increasing: project teams should consider the most appropriate location for visual display units (see also paragraph 3.30). Storage units for stationery such as x-ray and pathology request forms are needed. In-patients health records and x-rays are usually stored in a mobile records trolley which is parked next to the staff base. Facilities for viewing x-rays should be nearby, but should not obstruct access to, or activities at, the staff base. The working surface of the staff base should be large enough to accommodate four medical and nursing staff simultaneously.

4.25 It is inevitable that patients are disturbed by ward activities; this nuisance is particularly unwelcome at night. The following measures may serve to muffle sound, and reduce the light from the staff base:

a. a canopy over the staff base lined with sound absorbing materials;
b. careful shading, direction, and intensity control of lights at the staff base;
c. variable sound volume on telephone bells, with lights as an alternative to sound at night;
d. full height glazed partitions with doors to patients' bedrooms;
e. soft floor finish.

Sister's office

4.26 An office for ward administrative work and for private discussions with patients, relatives or staff. Space should be sufficient to accommodate a patient and/or relatives in a wheelchair or with walking aids. Suitable facilities for the short term storage of patient's valuables should be provided. The senior nurse's office is described in paragraph 4.57.

Doctors' office

4.27 An office specifically for use by junior medical staff for writing notes, confidential medical discussions and interviewing patients' and relatives in privacy. Office accommodation for consultants and their secretaries is described in HBN 18 'Office accommodation in health buildings' (in preparation).

Utilities

Treatment and examination room

4.28 The treatment room provides facilities for medical and nursing staff to perform certain clinical procedures. The treatment room may also be used for medical examination of the patient.

4.29 The patient may be ambulant, in a wheelchair, on a trolley, or on a bed; the door width must be sufficient to permit their passage. Door swings should not impede movement or activities within the room. All round access to the patient on the examination couch is essential. The examination couch must be mobile so that it can be moved out of the way to allow access to patients who need to be treated on a patient trolley or bed.

4.30 This room should be equipped with terminal units for oxygen and for vacuum, an x-ray viewing facility, a

mobile lamp, and clinical hand washing facilities. Clinical quality colour rendering light sources should be provided and walls, ceilings and floors should be of suitable colour and reflectancies. Natural light is not essential; mechanical ventilation will be required.

4.31 All supplies' should be stored in the clean utility space; the treatment room is not suitable for storage.

Clean utility

4.32 Adjacent to the staff base, and in close proximity to the treatment room when this is provided, the clean utility is the holding and preparation area for all clean and sterile supplies used in the treatment of patients. Medicine and dressing trolleys should be parked here. It is also used for the safe keeping of drugs, medicines and intravenous infusion packs.

4.33 A repeater warning light associated with the Controlled Drugs cupboard, should be installed at the staff base.

Dirty utility

4.34 The dirty utility provides facilities for the preparation for use, and disposal of contents following use, of bedpans, urinals and washbowls. The distance between the bed areas and the dirty utility should be as short as possible. Project teams must decide between a disposable bedpan system with bedpan macerator or a non-disposable system with bedpan washer, and plan accordingly. In making their choice project teams should take into account not only cost and storage needs but also the fact that bedpan macerators are more noisy when in use and may disturb patients, particularly at night.

4.35 Working stocks of disposable items, for example urinals, bedpans, vomit bowls etc. should be available on open adjustable shelving for easy access.

4.36 The dirty utility is also used for urine testing, holding specimens, and parking sanitary chairs and commodes. The clinical specialty of the ward, or the local laboratory services may be such that a refrigerator for holding specimens for pathological investigation must be provided.

4.37 Space for the temporary holding of materials for disposal or reprocessing should be limited because sacks and bags, once full, should be closed and taken to the disposal hold to await collection. Prompt removal of bags to the collection point will preclude obstruction of the activity space and a build up of odours. The whole hospital policy for disposal will determine the frequency of collection.

4.38 Mechanical extract ventilation should be provided.

Disposal hold

4.39 This room should, if possible, be accessible from within the ward and also close to the hospital street. Collections, except for 'sharps' containers which are held in the dirty utility room for security reasons, may then, be made without portering staff needing to enter the main circulation space of the ward.

4.40 Bagged refuse, used linen, and possibly sterile supply service items for reprocessing are held for collection. The disposal hold should be subdivided so that each category may be held separately, thus lessening the risk that reprocessible items are sent for incineration.

4.41 The size of the disposal hold should be determined by the ratio of the rate of accumulation of material for disposal to the frequency of collection.

Ward pantry

4.42 The ward pantry should be equipped with facilities for:

a. the preparation of beverages and light snacks;
b. the filling of patients' water jugs;
c. storage of dry goods, and a limited amount of crockery and cutlery;
d. refrigeration of perishable food;
e. accommodating food trolley prior to serving meals to patients.

A mechanical dishwasher and separate facilities for washing-up and hand-washing are required. Crockery and cutlery used for main meals is returned to the central washing-up service.

Cleaners' room

4.43 The cleaners' room is the base for domestic services staff who provide a cleaning service to the ward. It should include storage for, cleaning materials, and equipment in daily use, and facilities for the routine servicing and cleaning of equipment. Bulky equipment has to be moved in and out of the room and this should be taken into account in its location.

4.44 Space should be sufficient for the storage, washing, drying and manoeuvring of cleaning machines; for loading, parking and unloading trolleys, and for emptying and filling buckets and bowls. Access to the sink should be unrestricted. The room should be well lit and ventilated so that equipment can dry quickly.

4.45 Small security lockers may be required for storage of small items of personal belongings such as handbags etc.

Flower bay

4.46 In the flower bay patients and visitors, as well as staff, may arrange and dispose of flowers and wash and store vases.

Storage

4.47 The following paragraphs give details of storage needed in the ward. Because store rooms require internal circulation space they are a costly means of providing storage. For many items, especially equipment, storage in relatively shallow cupboards opening directly from circulation areas may be convenient and cheaper.

Equipment store and Stock materials store

4.48 These stores are used for consumables such as:

a. bulk supply boxes containing disposable items;

b. disposable bags of various types and size;

c. stationery;

d. equipment such as bed cradles and IV infusion stands;

e. physiotherapy/occupational therapy aids.

Some materials may be stored on open shelving. The equipment store should be designed so that equipment is accessible and can easily be manoeuvred. This store should be well lit; poor illumination is false economy.

Equipment parks

4.49 Emergency equipment, such as the resuscitation trolley, must be parked where it is accessible from the bedrooms, but should not obstruct circulation areas. Less frequently used equipment such as patient hoists and a weighing machine should be kept in the Equipment store. Orthopaedic wards require additional space, which may be shared between wards.

Linen storage

4.50 The type of linen store depends on the linen supply policy: for a top-up system, a room with shelving; for an exchange trolley system, a space to park linen trolleys. In both cases, the volume of storage space is determined by the frequency of delivery. Spare pillows, duvets and blankets should be stored in this space.

Patients' clothing and suitcases

4.51 Dependent upon the policies for bedside furniture and handling patients' clothing, a small storage area may be required.

Staff facilities

4.52 If a central or zonal changing facility is available then a cloakroom with small secure personal lockers should suffice; some of these lockers should be available for visiting staff. This room should be adjacent to a WC with handbasin, reserved for staff.

4.53 If female staff do not use a central/zonal facility then the changing room should include:

a. a curtained cubicle so that they may change in privacy;

b. full length personal lockers for secure storage of clothing and personal items;

c. facilities for the secure hanging of wet clothes.

4.54 The extent to which similar separate accommodation is needed for male staff, which will depend on the number of male staff employed, is a matter to be decided by the project team.

Electricity supply accommodation

4.55 The switch-cupboard should be:

a. located so that the cost of cabling is minimised;

b. accessible from circulation areas (access space may be part of the circulation area);

c. sited away from water services;

d. lockable;

e. naturally ventilated.

There should be clear and safe access for maintenance staff and care should be taken to ensure that safety is not compromised during maintenance, for example by traffic or the opening of adjacent doors.

Essential Complementary Accommodation

Seminar room and Clinical Teacher's office

4.56 These facilities may be shared between a group of wards, and may be available by arrangement to other users. The project team should avoid any unnecessary duplication of seminar rooms, while ensuring they are close to the wards so that staff can be recalled quickly and easily. The seminar room should be available to all disciplines for teaching, tutorials, meetings and case conferences, as indicated In paragraph 2.16. It should accommodate the use of educational equipment, x-ray viewing, and note-taking.

Senior Nurse's Office

4.57 An office for the senior nurse responsible for a number of wards, should be located near to the wards being controlled, but not within any one ward. Senior night staff may also use this office.

Relatives' rooms

4.58 The extent of provision of relatives' rooms, where relatives of seriously ill patients can rest during the day

and sleep overnight in comfort, is determined by whole hospital policies. This accommodation must be close to wards.

Optional Accommodation and Services

Cook-chill trolley holding room

4.59 This optional space is shared by adjacent wards.

4.60 To this space a number of purpose built trolleys are delivered from the Central Food Production Unit and await transfer to the ward at mealtimes. The space must be large enough to permit the easy manoeuvre of the large heavy trolleys. For further information see HBN11 'Central Food Production Unit and satellite accommodation' — in preparation.

5 Other General Functional and Design Requirements

5.1 This Chapter contains additional guidance concerning aspects of function and design which are common to health buildings generally.

Statutory and other requirements

5.2 Health Circular HC(88)60/HC(FP)(88)29 issued in December 1988, in Wales WHC (89)20, advises authorities that their building schemes should comply with the requirements of building legislation (even where these are not legally enforceable against authorities) and with all other relevant codes of practice standards. It also requires authorities to ensure that they have adequate procedures to ensure compliance. Attention is also drawn to HC(86)14 — in Wales WHC(87)7, concerning Food Hygiene and Pest Control in the Health Service, and HC(87)3, in Wales WHC(87)8, concerning Health and Safety at Work: Crown Immunity. These give the practical implications of the change in the law on Crown Immunity. This Note takes account as far as possible of all statutory and other requirements current at the time of publication but health authorities are reminded of their responsibility for ensuring compliance with statutes, regulations, codes and standards including Health Service Fire Standards.

Smoking

5.3 Health Circular HC(85)22 dated May 1985 — in Wales WHC(85)31 dated June 1985 — provides guidance about smoking in health buildings. While recognising that the responsibility for determining local policies rests with the health authority, the Circular recommends that smoking should be restricted as far as is practicable and, where it is permitted, confined to specially designated areas which are clearly signposted. In such areas ventilation should be sufficient to prevent discomfort to non-smokers and the spread of odours to other areas.

Upgrading and adaptation of existing buildings

5.4 The standards set out in this guidance essentially apply to the provision of wards by new building, and it is not intended that they should be applied retrospectively to existing stock. However, the principles are equally valid and should be applied, so far as is reasonably practicable, when existing accommodation is being upgraded or new accommodation is being constructed within an existing building, which may previously have been used for other purposes.

5.5 The cost of upgrading work should conform to the guidelines indicated in the Department's WKO letter (81)4 — AWO(81)8 in Wales. The guidelines take into consideration the estimated life of an existing building, and the difference in cost between upgrading the building and a new building.

5.6 Before any decision is made to carry out an upgrading project, consideration must be given to the long-term strategy for the service, the space required for the new service, and the size of the building. Regard must also be paid to the orientation and aspect of the building and the adequacy and location of all necessary support services.

5.7 If there emerges a prima facie case for upgrading, a thorough analysis of all functional and physical conditions of the existing building should be undertaken.

5.8 When comparing the cost of the upgrading or adapting an existing building to that of a new building, in addition to the building cost, due allowance must be made for the cost of relocating people, demolition, and salvage costs, disruption of services in a phased project, and the temporary effects on running costs of any impaired functioning of areas affected by upgrading.

5.9 The check of physical and other aspects of existing buildings should include:

a. availability of space for alterations and additions;

b. type of construction;

c. insulation;

d. age of the buildings, condition of fabric for example external and internal walls, floors, roofs, doors and windows, which may be determined by a condition survey;

e. life expectancy and adequacy of engineering services, ease of access and facility for installation of new wiring and pipework, if required;

f. the heights of ceilings (high ceilings do not necessarily call for the installation of false ceilings which are costly and often impair natural ventilation);

g. changes of floor levels to obviate hazards to disabled people;

h. fire precautions;

j. physical constraints to adaptation such as load bearing walls and columns.

5.10 Having decided that existing premises are suitable for upgrading or conversion, the main requirement will be to assess how best the accommodation can be planned so as to facilitate the practice of modern care.

5.11 Not all wards are suitable for conversion into satisfactory and efficient modern wards. An unpublished study of the conversion and extension of cottage hospitals showed that it is easier to convert accommodation designed for in-patients to out-patients and other functions, and provide new accommodation for the wards.

5.12 When open wards are being upgraded there is a danger that, in attempting conversion to a modern ward, the advantages of the open ward may be lost, without gaining the benefits of a modern layout. For example, if partial height partitions are used to subdivide an open ward into bays it is far harder for nurses to observe the patients, and vice versa, and there is little, if any, reduction in noise and disturbance. Such conversions generally result in a reduction in bed numbers, with higher running costs per bed.

5.13 This summary of the main aspects of upgrading is general in character and it is recognised that each upgrading project will present its own individual problems. In many instances compromises may have to be made between Building Note standards and what it is possible to achieve. Upgradings should be functionally sound — not merely cosmetic — and appropriate for the projected needs of patients and staff for a number of years to come.

Component data

5.14 The Component Data Base consists of a series of Health Technical Memoranda (HTMs) which provide specification and design guidance on building components for health building which are not adequately covered by current British Standards. No firms or products are listed. The numbers and titles of the HTMs in the series are listed in the bibliography.

6 Engineering

Introduction

6.1 This Chapter describes the engineering services contained within the ward and how they integrate with the engineering systems serving a whole site. The guidance should not inhibit the design solution, but will acquaint the engineering members of the, multidisciplinary design team with the design criteria and material specification needed to meet the functional requirements.

6.2 Documents referred to by number, for example,[10] are listed at the end of this Chapter. They are numbered in order of first appearance. Each repeated reference retains the same number.

Model specifications

6.3 A series of model specifications, for specialised engineering services in health-care buildings, have been issued nationally and are sufficiently flexible to meet local needs. The Cost Allowance is based on the qualities of material and workmanship described in the relevant parts of the model specifications.

Economy

6.4 Engineering services are a significant proportion of the capital cost and a continuing charge on revenue budgets. The project design engineer should therefore ensure:

a. economy in provision, consistent with meeting the functional requirements and maintaining clinical standards;

b. optimum benefit from the total financial resources these services are likely to absorb during their lifetime.

6.5 Where alternative design solutions are available their consequential capital and revenue costs should be compared using option appraisal techniques.[1] In this way due consideration is given to the need for, and cost of, maintenance and the eventual replacement of plant and equipment.

6.6 Heat conversion and distribution losses can be significant where buildings are located remote from the development's energy centre. The economic appraisal of alternative locations and design solutions should take this factor into account.

6.7 In any new project, consideration should be given to energy management and facilities offered by a whole hospital control system to enable some measure of energy accounting to be exercised at ward level.

6.8 After satisfying the Building Regulations[2] on the standards of thermal insulation provided, the project team should consider the economics of additional insulation.

6.9 In view of the increasing cost of energy, the project team should consider the economic viability of heat recovery from mechanical ventilation systems. Designers should also ensure that those services which use energy do so efficiently.

Maximum demands

6.10 User demand on engineering services is often difficult to predict, but experience indicates that services designed for simultaneous peak conditions are seldom fully utilised in practice. The estimated maximum demand, and storage requirement (where appropriate), for each engineering service in this accommodation, will need to be assessed individually to take account of the size and shape of the ward, geographical location, operational policies and intensity of use. As a guide and for preliminary planning purposes only, the following are the estimated maximum demands for a 28-bed ward.

Service	*Typical Max. Demand*	*Notes*
Heating/ventilation/ DHWS (kW)	75	
Domestic HWS (litre/sec)	1.50	1000 litres storage (2 hours recovery)
Cold water (litre/sec)	1.75	6000 litres storage (24-hour supply)
Supply ventilation (m^3/s)	0.214	
Extract ventilation (m^3/s)	0.500	Clean and dirty
Electrical (kVA)	29	Includes essential 19kVA
Medical gases (litre/ min)		
Oxygen	62	
Vacuum	95	

Space requirements for services

6.11 Space for plant and services is important and the layout should provide:

a. easy and safe means of access, protected as far as possible from unauthorised entry;

b. space for frequent inspections and maintenance;

c. for eventual removal and replacement of plant.

6.12 Recommended spatial requirements for mechanical, electrical and public health engineering services in health buildings are given in HTM23.[3] The information in this HTM is specifically intended for use during the initial planning stages when precise dimensional details of plant are not available.

6.13 The distribution of mechanical and electrical services to final points of use should, wherever possible, be concealed in walls and above ceilings. Heat emitters should be contained within a 200mm wide perimeter zone under window sills and critical dimensions should be taken from the boundary of this zone. For costing purposes the 200mm zone, which includes the floor area occupied by minor vertical engineering ducts, is included in the building circulation provision.

Activity Data

6.14 Functional requirements, environmental data and equipment details, are described in the Activity Data Sheets (Chapter 8) and should be referred to when positioning equipment and outlets.

Safety

6.15 Section 6 of the Health and Safety at Work etc Act 1974[4] as amended by Schedule 3 of the Consumer Protection Act 1987,[5] imposes statutory duties on all persons who design, manufacture, import, supply, install or erect "articles for use at work". One of the requirements of this section is to ensure, so far as is reasonably practicable, that the article is designed and constructed so that it will be safe and without risks to health at all times when it is being set, used, cleaned or maintained by a person at work. All parts of engineering systems are covered by the term "articles for use at work".

Fire precautions

6.16 Design guidance for fire precautions in new hospitals is given in HTM 81.[6] Technical information concerning the design and specification of fire detection and alarm systems is detailed in HTM 82[7] which also replaces or modifies certain clauses of BS5839 Part 1[8] to meet the needs of health buildings. More general advice on fire prevention, including the storage of flammable materials, is given in HTM 83.[9]

6.17 The design of the engineering services should comply with the recommendations in the above series of HTMs. The engineer should also verify his proposals in accordance with the procedure described in this building note, paragraphs 3.11 to 3.14.

Noise

6.18 Excessive noise in individual areas, whether internally or externally generated and transmitted, can adversely affect the operational efficiency of the ward and can cause discomfort. In this respect, the dirty utility area and bedpan disposal unit need particular attention. The limits and means of control advocated in Hospital Design Note 4[10] including its revisions[11] and the means of control given in Engineering Data Sheet DH1[12] should provide an acceptable acoustic environment.

6.19 There will also be a need to ensure auditory privacy in office areas, at the staff base, and in the treatment room. Acceptable noise levels and, where applicable, any requirement for auditory privacy in individual spaces are shown on the Activity Data 'A' Sheets.

Control access

6.20 Primary engineering distribution control and isolation devices should be:

a. located in circulation rather than working areas;

b. protected against unauthorised operation, for example, switchgear and fuse-boards should be housed in secure cupboards;

c. easily accessible for safe staff operation where appropriate.

Engineering commissioning

6.21 It is essential that engineering services should be fully commissioned. HTM 17[13] describes the requirements which should be included in the design and building contract documents. Flow measurement and proportional balancing of air and water systems requires adequate test facilities, eg orifice plates, venturi valves, pitot tube tappings, etc, to be incorporated at the design stage.

MECHANICAL SERVICES

General scope

6.22 The mechanical installation includes:

a. heating;

b. ventilation (including an appropriate proportion of the air handling and treatment plant and associated controls);

c. hot and cold water;

d. fire main;

e. medical gases;

6.23 For Cost Allowance purposes, the distribution of the services commence at their points of entry into the ward.

6.24 Recommended room temperatures, air change rates, hot water service temperature, etc., are grouped under "technical design data" on each A-sheet. The B-sheets give the disposition of engineering outlets for the activities described.

Heating

6.25 General space heating requirements can usually be met by low pressure hot water radiators. They should be of the low surface temperature type and the system should be designed to ensure that the surface temperature does not exceed 43°C. Exposed hot water pipework, accessible to touch, should be insulated.

6.26 Radiators should normally be located under windows or against exposed walls, with sufficient clear space between the top of the radiator and the window sill to prevent curtains reducing the output. There should be adequate space below to allow cleaning machinery to be used. Where a radiator is located on an external wall, back insulation should be provided to reduce the rate of heat transmission through the building fabric.

Temperature controls

6.27 All radiators should be fitted with thermostatic radiator valves. These should be of robust construction and selected to match the temperature and pressure characteristics of the heating system. The thermostatic head, incorporating a tamper-proof facility for presetting the maximum room temperature, should be controlled via a sensor located integrally or remotely as appropriate. To provide frost protection at it's minimum setting, the valve should not remain closed below a fixed temperature.

6.28 Consideration should also be given to modulating the flow temperature to the heating appliances in accordance with the external ambient temperature.

Ventilation

6.29 Single and multi-bed areas will normally be naturally ventilated, but the treatment room and some other areas will require mechanical supply and/or extract to meet clinical or functional requirements.

6.30 Wherever possible, individual spaces should be naturally ventilated in order to limit the level of mechanical ventilation.

6.31 Deep planned spaces may need mechanical ventilation. Internal planning of the ward should, therefore, seek to minimise the need for mechanical ventilation by ensuring that, wherever practicable, core areas are reserved for:

a. rooms that require mechanical ventilation, for clinical or functional reasons, irrespective of whether their location is internal or peripheral, for example, sanitary facilities, dirty utility and beverage preparation areas;

b. spaces which have only transient occupation and, therefore, require little or no mechanical ventilation, for example, circulation and some storage areas.

6.32 Air movement induced by mechanical ventilation should be from clean to dirty areas where these can be defined. The design should allow for an adequate flow of air into any space having only mechanical extract ventilation, via transfer grilles in doors or walls. Such arrangements, however, should avoid the introduction of untempered air and should not prejudice the requirements of fire safety or privacy.

6.33 Ventilation of the ward as a whole should be considered in order to ensure that both supply and extract systems are in balance, taking due account of infiltration in winter.

6.34 Fresh air should be introduced via a low velocity system and should be tempered and filtered before being distributed via high level outlets. Diffusers and grilles should be located to achieve uniform air distribution within the space, without causing discomfort to patients.

6.35 Ventilation supply plant should include air filters having a minimum arrestance of 85% when tested in accordance with BS6540, Part 1.[14] In urban or other areas of high atmospheric pollution, a higher standard of filtration may be economically justified to reduce the level of staining to internal finishes. Filters must be readily accessible for replacement and should be provided with a pressure-differential indicator.

6.36 A separate extract system will be required for 'dirty' areas, for example utility and sanitary facilities. It should operate continuously throughout the day and night. A dual motor fan unit with an automatic changeover facility should be provided.

6.37 External discharge arrangements for extract systems should be protected against back pressure from adverse wind effects and should be located to avoid reintroduction of exhausted air into the building through air intakes and windows.

Ventilation controls

6.38 Supply and extract ventilation systems should include controls and indicator lamps in the plant room to confirm the operational status of each system. Alarms

should be repeated in the works department. Controls will usually include those for temperature/time switching functions. Their selection should take account of the extent to which they can be linked to, or provided by, a building management system serving the whole hospital.

Hot, cold and drinking water services

6.39 The requirements for the control of Legionella bacteria in hot and cold water systems are set out in the DHSS Code of Practice.[15]

6.40 Guidance on the design and installation of cold water supply pipework and distribution systems is also given in HTM 27.[16] For frost protection purposes, and to prevent condensation staining decorative finishes, all cold water pipework, valves, and flanges, should be insulated and vapour sealed.

6.41 The domestic hot water supply should be taken from the general hospital calorifier installation at an outflow temperature of 60°C ± 2.5°C, and distributed to all outlets so that the return temperature at the calorifier is not less than 50°C. Outlet temperatures and fittings for sanitary equipment are shown on Activity Data Sheets.

Piped medical gases

6.42 Guidance on piped medical gases is contained in HTM 22.[17]

ELECTRICAL SERVICES

General scope

6.43 The electrical installation includes:

a. main intake switchgear, local isolators and distribution boards;

b. lighting;

c. power (including supplies to ventilation plant);

d. earth bonding of extraneous metal work;

e. telephone wiring;

f. wireway for data links;

g. clocks;

h. fire alarms;

j. staff location;

k. staff call.

6.44 For Cost Allowance purposes, the distribution of the services commence at their points of entry into the department.

6.45 These installations should comply in all respects with the current IEE Regulations for Electrical Installations[18] and conform to the requirements of HTM 7.[19]

6.46 Recommended levels of illumination, disposition of outlets for power, telephones, call systems, clocks, etc, in individual spaces, are shown on the Activity Data Sheets.

6.47 The point of entry for the electrical supply will be a switch-cupboard housing the main isolators and distribution equipment. This space will also be the distribution centre for subsidiary electrical services. Switchgear should be lockable 'in the off position'. Wherever possible, all equipment should be mounted at a height to give easy access from a standing position.

Electrical installation

6.48 The electrical installation in occupied areas should be concealed using PVC insulated cable in screwed steel conduit or trunking; but in certain circumstances, mineral insulated metal sheathed cables may be necessary. Steel conduit and trunking wireways for communication and data systems should also be concealed wherever possible.

Electrical interference

6.49 Guidance concerning the avoidance and abatement of electrical interference is given in HTM 14.[20] Fluorescent luminaires should comply with BS5394.[21]

6.50 Care should be taken to avoid mains-borne interference and electrical radio frequency interference affecting computers and other electronic equipment used here or elsewhere on a hospital site.

Lighting

6.51 Practical methods of lighting the various functional spaces are contained in the CIBSE Lighting Guide.[22] Luminaires should be manufactured and tested in accordance with the requirements specified in the relevant sections of BS4533.[23] Their location should afford ready access for lamp changing and maintenance, but with the overriding requirement that the recommended standard of illuminance is provided to the task area.

6.52 Colour finishes and lighting throughout circulation areas should be co-ordinated to create a calm and welcoming atmosphere.

6.53 It is essential that fluorescent lighting in all clinical areas is selected from one of the recommended types of lamp having suitable colour rendering characteristics. Further guidance is contained in engineering Data Sheet DE 2.1–2.5.[24] In practice, consideration should be given to using the same fitting in clinical and non-clinical spaces within the ward, in order to simplify maintenance and stock of replacement lamps. HN(85)20 (CAWO(85)3 in Wales)[25] describes some high efficiency fluorescent lamps with good colour rendering properties which are also suitable for general use.

6.54 Control of lighting is normally by local switches. The circuiting of luminaires should be arranged to control groups of fittings in order to provide flexibility of switching arrangements. Such a facility is particularly important in large spaces where the level of daylight is not uniform and artificial lighting is likely to be needed for long periods in some areas remote from windows.

6.55 Patient reading lights should be provided for each bed. Each luminaire should be individually switched from the bed-head unit.

6.56 Night lights may be wired from a common time-switch and controlled to restrict their use to the silent hours.

6.57 In areas where computer terminals are to be used, the lighting should be designed to avoid bright reflections on the screen and to ensure that the contents of the screen are legible. Further guidance can be found in CIBSE Technical Memoranda TM6.[26]

Controlled Drugs cupboard

6.58 In compliance with HC(77)16 (WHN(77)32 in Wales),[27] a red indicating lamp should be provided on each Controlled Drugs cupboard. A remote indicating lamp should be provided, where appropriate, outside the doorway to the room in which the cupboard is located and at the corresponding staff base indicator panel. The lamps should be interlocked with the cupboard, to give visual indication when the cupboard is unlocked, and should be supplied from an 'essential circuit'. For further information see HTM 63[28] and its associated specification for electrical services. The cupboard should be in accordance with BS2881.[29]

Socket outlets and power connections

6.59 Sufficient 13-amp switched shuttered socket outlets, connected to ring or spur radial circuits, should be provided to allow all portable appliances likely to be used simultaneously to be individually supplied. The installation of twin outlets should be considered where these activities occur in juxtaposition.

6.60 Socket outlets, in areas where essential equipment may be used, should be connected to at least two separate ring circuits of common phase.

6.61 Domestic cleaning appliance flexible leads are assumed to be nine metres long. Socket outlets, usually in corridors, should be provided to enable the machines to operate over the whole area of the ward.

6.62 Fixed appliances rated up to 13 amps should be permanently connected to double pole switched spur boxes and fused as required. Appliances rated in excess of this load, or those requiring a three-phase supply, should be permanently connected to separate final circuits from fuse-boards and independently switched at a local isolator of appropriate rating.

6.63 Local switches, or other means of electrical isolation, should be provided adjacent to plant and equipment to ensure the safety of operators and maintenance staff.

6.64 Heating appliances, and automatically operated equipment, should be provided with indicator lights to show when the equipment is energised. Indicators should be incorporated in the control panel of the apparatus, in the control switch, or in the socket outlet from which the apparatus derives its supply.

6.65 The electrical supply connections to electromedical equipment should comply with BS 5724.[30]

Emergency electrical supplies

6.66 Guidance concerning the provision of emergency electricity supplies is contained in HTM 11.[31]

6.67 Socket outlets connected to essential circuits will include those at the bedhead, staff base, and in the treatment room. The supply to the Controlled Drugs cupboard should also be from an 'essential' circuit.

6.68 All communication, clock and alarm systems, should be supplied from 'essential' circuits.

Door security inter-communication system

6.69 A door security intercommunication system is required between the staff base and entrance to the ward to prevent unauthorised entry, whilst permitting free movement of staff. The system should provide for verbal communication with, and an electromagnetically operated door lock to be controlled from, the staff base.

6.70 An override, located adjacent to the entrance, is required to provide staff with a convenient exit route for normal work or in the event of fire. The lock should disengage on initiation of the fire alarm system.

Patient/staff and staff/staff call systems

6.71 Call points are indicated on the Activity Data Sheets. A visual and audible indication of operation should be provided at the staff base to give responding staff unambiguous identification of the call source. Further guidance on patient/staff and staff/staff call systems is contained in HTM 15[32] and in Engineering Data Sheet DU 3.1.[33]

Staff location system

6.72 The staff location system employed in the hospital should be extended to give adequate cover to the ward. Guidance on these systems is given in HTM 20.[34]

Telephones

6.73 Central telephone facilities for internal and external calls should be extended to serve the ward in accordance with the requirements shown on the Activity Data Sheets. Wiring should terminate at each extension point in a standard line jack unit.

6.74 Outlets should also be provided for mobile pay phones. These should be connected direct to the public network by separate exchange circuits and not routed via the hospital switchboard. All line jack units, provided for a particular pay phone, should be connected to a common exchange circuit as far as is practicable, in order to economise on the number of exchange lines allocated to this facility.

6.75 Guidance concerning the provision of telephone services, including the telephone internal cabling distribution and telephone handsets, is given in HBN 48.[35]

Wireways for data links

6.76 Wireways for data links should be provided within this department and to the main hospital system. Normally the cables can be accommodated in the extra low voltage compartment provided for other systems and, therefore, there should be no need to make extra provision.

Wireways for physiological monitoring equipment

6.77 Since automated physiological monitoring at the bedhead may be required in the future, it may be advisable to consider installing wireways during construction. The installation of wireways after the hospital has been completed will be disruptive.

Electric clocks

6.78 Clocks should operate in conjunction with a master impulse clock system. Where sweep second hands are required, they may be provided by an integral synchronous motor which may be wired to an adjacent lighting circuit.

Radio and television

6.79 The radio/television relay system should be supplied via the hospital communal aerial installation and central amplification equipment.

6.80 Radio and TV sound should be available at each bed position with a handset having a selector switch and volume control serving an earphone unit.

6.81 TV outlet sockets should be provided in day spaces.

6.82 Details of the requirements for radio and TV are shown on the Activity Data Sheets.

Lightning protection

6.83 Protection against lightning should be provided in accordance with HTM 7,[19] HSE Data Sheet DB 2[36] and BS6651.[37]

INTERNAL DRAINAGE

General scope

6.84 The primary objective is to provide an internal drainage system that uses the minimum of pipework and remains water and air-tight at joints and connections, but is sufficiently ventilated to retain the integrity of water seals.

Design parameters

6.85 General design guidance is given in the relevant British Standards and Codes of Practice, including BS5572,[38] and the current Building Regulations. Recommendations regarding spatial and access requirements for public health engineering services are given in HSE Data Sheet EA5.[39]

6.86 The gradient of branch drains should be uniform and adequate to convey the maximum discharge to the stack without blockage. Practical considerations such as available angles of bends/junctions and their assembly, as well as space considerations, usually limit the minimum gradient to about 1:50 (20mm/m). For larger pipes, eg 100mm diameter, the gradient may be less, but will require workmanship of a high standard if adequate self-cleansing flow is to be maintained. It is not envisaged that pipes larger than 100mm diameter will be required within inter-floor or ground floor systems serving this department.

Operational considerations

6.87 Unusual and difficult maintenance problems can arise because of user interference and abuse. For example, the disposal of paper towels into WCs after hand-washing or after their misuse for some other purpose is a frequent cause of blockages, particularly in long branches laid to low gradients. Adequate provision of disposal receptacles, or where appropriate, the installation of warm-air driers can help to mitigate this problem.

Materials specification

6.88 The materials specified for the drainage system in this department will depend upon their location and the nature of the effluent being discharged. Waste pipework should as far as practicable be concealed. Although adequate for drainage requirements, UPVC may not always be acceptable to the fire officer and should not be installed above 'sensitive' areas, eg operating theatres, intensive therapy, radio-diagnostic, catering departments, electrical switch-cupboards.

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7 Cost Information

Introduction

7.1 The practical implications of the guidance in this Note have been described and realised in the activity data sheets and neutral room layouts which have been used in drawing up an exemplar plan. Cost Allowances have been calculated using information extracted from this data.

7.2 Project teams are reminded that all activities should be carefully considered so that, where appropriate, (see paragraph 2.36), space can be used for other activities taking place at different times.

Works costs

7.3 The Cost Allowance covers the building and engineering requirements set out in this Note. It assumes that a centralised staff changing system will be employed and that catering on the ward will be by a central tray service.

7.4 The Functional Unit for this service, is the 'Bed'. The total Cost Allowance for a scheme is derived by aggregating the cost of the functional units, Essential Complementary Accommodation and Optional Accommodation and Services as appropriate to the particular scheme.

Essential Complementary Accommodation (ECA)

7.5 This comprises activity spaces which are essential to the provision of Adult Acute Wards but which are not included in the Functional Unit cost. The ECA costed in this Note are:

Seminar Room

Clinical Teacher's Office

Senior Nurse's Office

Relatives' Room

7.6 The Cost Allowances have been calculated on the assumption that wards will be built in pairs, enabling them to share a Doctors' Office, Staff Lockers, Disposal Hold and Cleaners' Room. Where a single, or an odd number of wards is planned it will be necessary to provide additional accommodation which is covered by the separate Cost Allowance for 'Shared Accommodation (for single ward)'.

Optional Accommodation/Services (OAS)

7.7 The trolley holding room will be required where the Cook-chill meal service option is preferred. The Cost Allowance is for a room serving four wards.

Dimensions and areas

7.8 At the early stages of a project, designers should have data available which enables them to make an approximate assessment of the sizes involved. Schedules of Areas, which are for illustration only, are provided at the end of this Chapter. It is emphasised that the areas published **DO NOT** represent recommended room sizes, maximum or minimum allowances or specific individual entitlements. Project teams are referred to the ergonomic diagrams in Appendix I and in Health Building Note 40 'Common Activity Spaces'.

Circulation spaces

7.9 Space for circulation, which includes allowances for planning provision, a heating and ventilating zone adjacent to the external walls, small vertical ducts and partitions, is included in the cost allowances.

Communications space

7.10 Staircases, lifts and plant rooms, with the exception of electrical switch cupboards, are not included in the cost allowances.

Engineering services

7.11 The following engineering services, as described in Chapter 5, and exemplified in the Activity Data, are included in the cost allowances. Primary engineering services are assumed to be conveniently available at the boundary of the ward.

a. **Mechanical services**

(i) Heating: Low pressure hot water radiator system;

(ii) Ventilation: Mainly natural in areas other than treatment rooms, some areas require mechanical supply and extract to meet clinical or functional requirements. An appropriate proportion of the air handling and treatment plant is included;

(iii) Cold water service: Supplied from central storage to service points including drinking water and fire hose reels;

(iv) Hot water service: Supplied from central storage to service points;

(v) Medical Gases: Piped supplies of oxygen and vacuum from the central system.

b. **Electrical services**

(i) Departmental distribution switchboard;

(ii) Lighting system: Fluorescent, safety and night light luminaires;

(iii) Power system: Socket and other power outlets for fixed and portable equipment. Standby and safety installations. Supplies to ventilation plant;

(iv) Patient/Staff and Staff/Staff call system;

(v) Staff location system;

(vi) Fire, security, medical gases and drug cupboard alarm systems;

(vii) Impulse clock system;

(viii) Telephone systems (excluding handsets);

(ix) Data transmission and patient monitoring systems (wireway only).

c. **Equipment (Group 1)**

(i) Water boiler;

(ii) Dishwasher;

(iii) Controlled drugs cupboard;

(iv) Twin X-ray viewer (3 No.).

Schedules of Accommodation

Activity Space	*Space Area Sq.m.*	*24 Beds*		*26 Beds*		*28 Beds*	
		Qty.	*Total Area Sq.m.*	*Qty.*	*Total Area Sq.m.*	*Qty.*	*Total Area Sq.m.*
Single room	11.50	6.0	69.00	4.0	46.00	4.0	46.00
Multi-bed room — 4 bed	40.00			1.0	40.00	3.0	120.00
Multi-bed room — 6 bed	60.00	3.0	180.00	3.0	180.00	2.0	120.00
Day space	12.00	3.0	36.00	4.0	48.00	5.0	60.00
Day room	12.00	1.0	12.00	1.0	12.00	1.0	12.00
Shower/ WC/wash (with lobby)	6.50	3.0	19.50	4.0	26.00	5.0	32.50
En-suite shower/ WC/wash	3.00	3.0	9.00	2.0	6.00	2.0	6.00
Bathroom/ WC/wash	7.00	1.0	7.00	1.0	7.00	1.0	7.00
Assisted bathroom/ WC/wash	11.50	1.0	11.50	1.0	11.50	1.0	11.50
Assisted shower/ WC/wash	5.50	1.0	5.50	1.0	5.50	1.0	5.50
Clean utility	9.50	1.0	9.50	1.0	9.50	1.0	9.50
Dirty utility	11.50	1.0	11.50	1.0	11.50	1.0	11.50
Cleaner	7.00	.5	3.50	.5	3.50	.5	3.50
Disposal	3.00	.5	1.50	.5	1.50	.5	1.50
Treatment room	12.50	1.0	12.50	1.0	12.50	1.0	12.50
Pantry	10.00	1.0	10.00	1.0	10.00	1.0	10.00
Flower bay	1.50	1.0	1.50	1.0	1.50	1.0	1.50
Equipment store	8.00	1.0	8.00	1.0	8.00	1.0	8.00
Linen trolley bay	1.50	1.0	1.50	1.0	1.50	1.0	1.50
~~Food trolley bay~~	~~3.00~~	~~1.0~~	~~3.00~~	~~1.0~~	~~3.00~~	~~1.0~~	~~3.00~~
Resuscitation trolley bay	1.00	1.0	1.00	1.0	1.00	1.0	1.00
Sister's office	10.00	1.0	10.00	1.0	10.00	1.0	10.00
Doctor's office	14.00	.5	7.00	.5	7.00	.5	7.00
Staff base	11.00	1.0	11.00	1.0	11.00	1.0	11.00
Staff lockers	6.00	.5	3.00	.5	3.00	.5	3.00
Staff WC	2.00	1.0	2.00	1.0	2.00	1.0	2.00
Switchgear	2.00	1.0	2.00	1.0	2.00	1.0	2.00
NETT TOTAL			445.00		477.50		516.00
CIRCULATION ETC.			130.00		140.00		150.00
DEPARTMENTAL TOTALS			575.00		617.50		666.00

Essential Complementary Accommodation

Activity Space	*Space Area Sq.m.*	*Circn. Etc. Sq.m.*	*Total Area Sq.m.*
Orthopaedic Equipment Store	2.50	—	2.50
Seminar Room (10 persons)	19.00	4.00	23.00
Senior Nurse's Office	10.00	2.00	12.00
Clinical Teacher's Office	10.00	2.00	12.00
Relative's Room	9.50	1.50	11.00
Relative's W.C.	2.00	—	2.00
Relative's Shower/wash	2.50	—	2.50
Shared Accommodation (for single ward)	15.00	3.00	18.00

Optional Accommodation and Services

Activity Space	*Space Area Sq.m.*	*Circn. Etc. Sq.m.*	*Total Area Sq.m.*
Cook Chill Trolley Holding Room (Serving 4 wards).	22.00	4.00	26.00

8 Activity Data

Introduction

8.1 The expression 'Activity Data' refers to an information system developed to help project and design teams by defining the users' needs more precisely. This information constitutes the Activity Database, which was issued to Regional Health Authorities in England and to the Health Departments in Scotland, Northern Ireland and Wales in 1976. It comprises two types of information sheet: Activity Space Data Sheets (known as A-sheets) and their supporting Activity Unit Data Sheets (B-sheets).

8.2 A-sheets record in more detail than is described in this Note each task or activity that is performed in a particular activity space (which may be a room, space or bay) together with environmental conditions and the technical data necessary to enable the activities to be performed. Each A-sheet also contains a list of the titles and code numbers of the relevant B-sheets.

8.3 B-sheets provide narrative text and graphics to scale relating to one activity. They show equipment fitted or supplied as part of the building, and the necessary engineering terminals. There are also 'component B-sheets' which show a range of particular components rather than an activity.

8.4 Further information about the use and preparation of Activity Data can be found in the 'Guide to 'A' and 'B' Activity Data Sheets and their use in Health Building Schemes' which was issued to Regional Health Authorities in June 1980 and to NHS Authorities in Wales in November 1980. Copies of the Guide are available from the Department's Health Building Directorate, Branch ED6, Room 540, Euston Tower, 286 Euston Road, London NW1 3DN.

Activity Data applicable to this Note

8.5 The A-sheets recommended for the activity spaces described in this Note are either new sheets, amended ones or selected from existing sheets. A list of A-sheet code numbers and titles is given below.

8.6 Further Activity Data Sheets may be selected, or drawn up by project teams to their own requirements, for any services not described in the Note or included in the list. Members of project teams are advised to contact their Regional Activity Data Coordinator/Welsh Office for information and advice about the selection of activity data, at an early planning stage.

8.7 However, in order to ensure consistent and economic provision, variations from the A-sheets recommended for the spaces covered in this Note should be considered only where it has been decided that the function of a space will be substantially different from that described.

List of Activity Data A-Sheets

Activity Space	*A-Sheet Code Number*		*Paragraph number in HBN*
Single room	B	0301	4.4
Multi-bed room 6 beds with day area	B	0401	4.7
Day room	D	1104	4.10
Wash/ WC/Shower	V	1304	4.19
Ensuite Shower/ WC/ Wash	V	1303	4.5
Assisted bathroom	V	1706	4.20
Assisted shower	V	1604	4.19
Bathroom/ WC/ Wash	V	1718	4.18
Clean utility	T	0602	4.32
Dirty utility	Y	0302	4.34
Cleaner	Y	1201	4.43
Disposal	Y	0603	4.39
Treatment room	X	0103	4.28
Pantry	P	0602	4.42
Flower bay	Y	1403	4.46
Equipment store	W	1550	4.48
Linen trolley bay	W	1426	4.50
Sister's office	M	0201	4.26
Doctor's office	M	0310	4.27
Staff base	T	0102	4.23
Staff lockers	V	0619	4.53
Staff WC	V	1005	4.52
Switch-cupboard	K	0101	4.55
Hosereel/cupboard	K	0601	4.23
ECA			
Seminar room	H	0518	4.56
Senior Nurse's office	M	0201	4.57
Clinical Teacher's office	M	0201	4.56
OAS			
Cook-chill trolley holding room	P	0101	4.59

Appendix 1

Critical Dimensions

Introduction

1. Critical dimensions are those dimensions which are critical to the efficient functioning of an activity; thus the size of components, their position and the space around them may all be critical to the task being performed. Guidance on these dimensions for a particular activity is provided in the form of component-user data sheets. These illustrate components, ie equipment, furniture and fittings, and provide ergonomic data on the space required for users to move, operate or otherwise use the component; information about the component, eg fixing heights, and the users, eg reach, is also provided. Component-user data sheets thus complement the information given on Activity Data 'B' sheets. (See Chapter 8.)

2. This appendix contains sheets relevant to this Note. In addition, ergonomic data common to the design of a number of departments is contained in the Common Activity Spaces Health Building Note, HBN 40, to which reference should also be made.

Component dimensions

3. These relate to the size and position of components as follows:

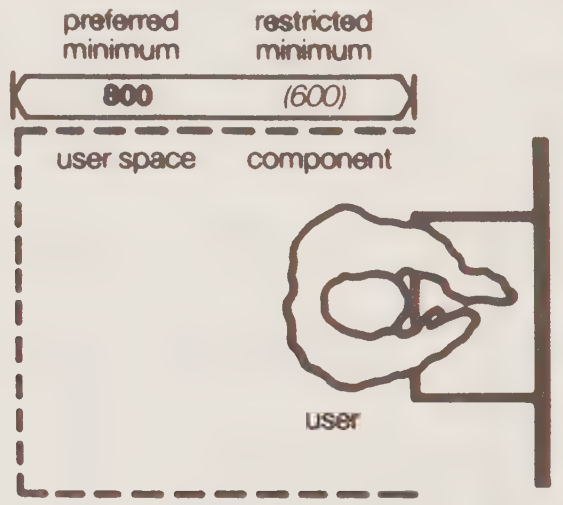
a. Sizes of components are shown thus

b. Preferred component fixing heights are shown as heights above floor level thus

(In some cases an acceptable range of fixing heights is also given in italics.)

Activity dimensions

4. Activity dimensions define the user space, which is the minimum space required to perform an activity. Two types of activity dimension are given:



a. Preferred minimum — This defines the minimum space required to carry out an activity efficiently and is shown in bold type.

b. Restricted minimum — this will only allow the activity to be performed at the expense of the user experiencing some difficulty. It is not recommended for general application but may be appropriate when considering the overlapping that can be allowed when two user spaces are adjoining.

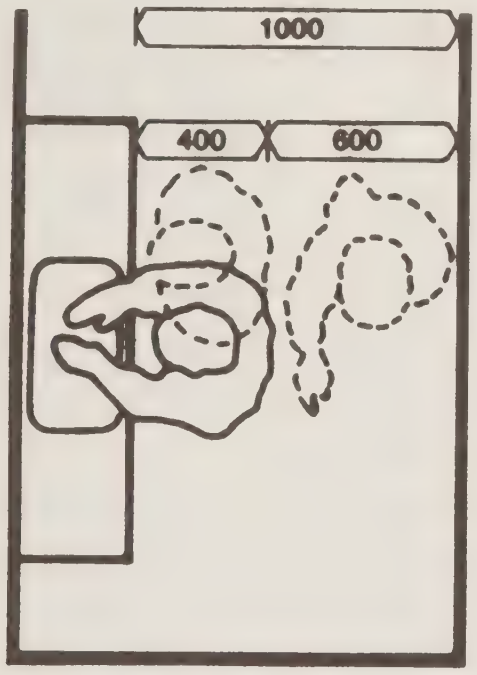
Selection of activity dimensions

5. When using component-user data sheets to design activity space layouts, selection of the appropriate activity dimensions is essential for economy and efficiency. Selection should be based on careful consideration of the frequency, duration, timing and importance of the activities and also the number of people involved. A typical example of the use of a sink showing activity dimensions provided by the component use data sheet is shown below.

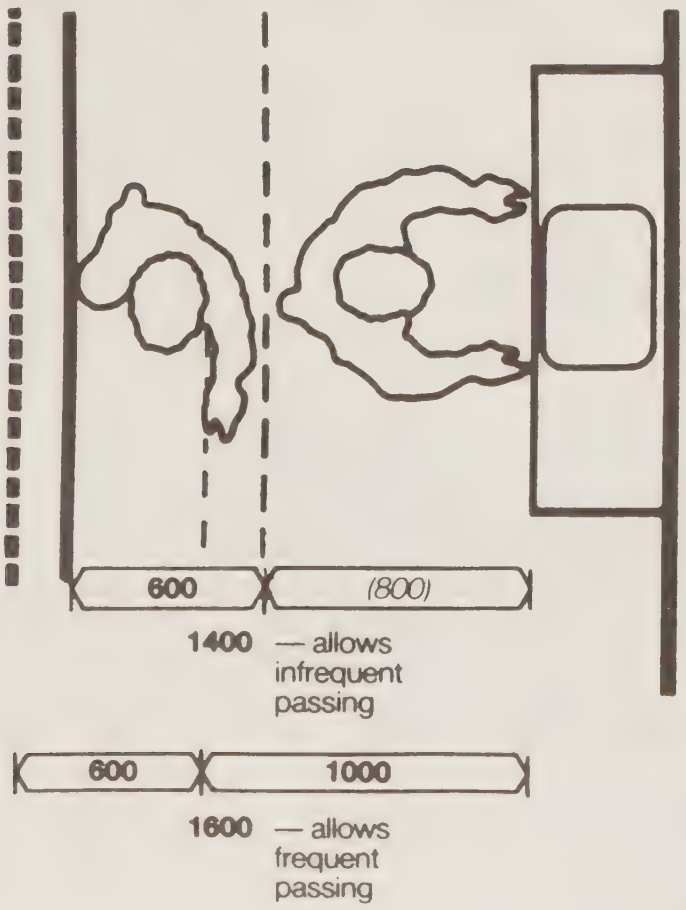
Examples

6. The following worked examples show the sink being used in three different situations and show how the appropriate dimensions would be selected. These examples have been simplified and additional factors such as the movement of mobile equipment may also be critical. The examples do not necessarily relate to this particular building guidance.

a. If the room is normally occupied by one person only the 1000 workspace dimension may be applicable. An (800) restricted dimension should not be used as this dimension is only applicable where two user spaces are adjoining, not where an individual user space is bounded by a wall or solid obstruction. If the person using the sink stops work and stands close to the sink, 1000 is also sufficient space to allow a second person to pass ie 600 + 400.

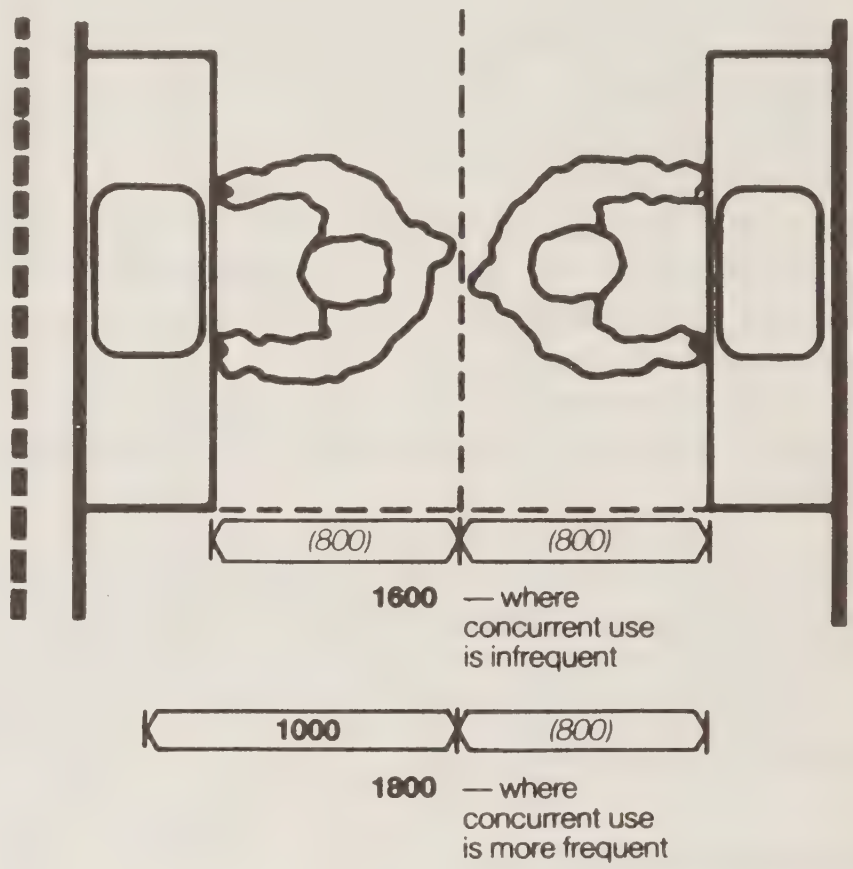


b. If space is required to allow a person to pass, without the user of the sink stopping work, then the 600 passing dimension is added to the workspace dimension. If passing is infrequent then temporary restriction of the sink user's space may be acceptable; this gives an overall dimension of 600 + (800) = 1400. If passing is frequent and restriction of the sink user's space is not acceptable the overall dimension is 600 + 1000 = 1600.



c. Where space has to be provided to enable two sinks to be used concurrently the overall dimension between sinks will be the sum of the workspace dimensions, eg if concurrent use is infrequent and of short duration then (800) + (800) = 1600 may be acceptable. Alternatively 1000 + (800) = 1800 allows the full workspace for one sink user and restricted space for the second user, where concurrent use of the sinks is more frequent.

Note. The passing of a third person between the two sink users may also be critical in this example. Where the sinks are staggered 1400 may be acceptable as in example b.



LIST OF ERGONOMIC DRAWINGS

Shower (wheelchair/assisted patients)

Single bedroom (with en-suite sanitary facilities)

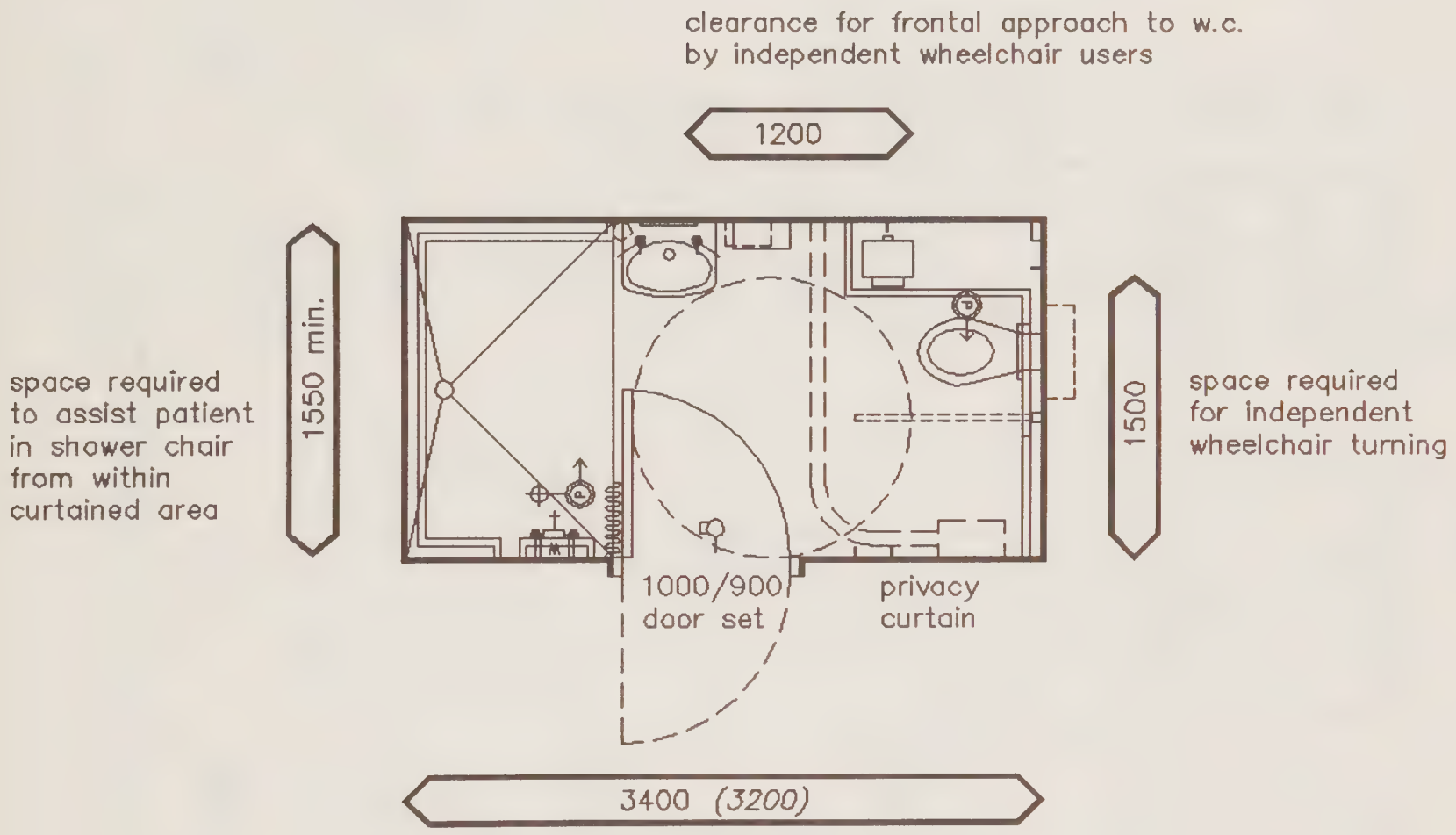
Staff base

Treatment room

Facilities for a patient who may be in a wheelchair or sanitary chair needing the assistance of staff to shower, use a washbasin and use WC

Activity space example layout not to scale

Shower
(wheelchair/assisted patients)



3400 (3200)

preferred minimum

Restricted minimum (recommended only in limited circumstances: see explanatory notes)

Notes

1. To safeguard the privacy of patients when using the w.c., it is desirable that access doors be adequately screened but not so as to impede access or egress by assisting staff.

2. Inward opening door is preferred for independent wheelchair users as long as the wheelchair turning is not obstructed when the door is opened fully. Outward opening of the door is necessary in emergencies e.g. if the patient collapses against the door.

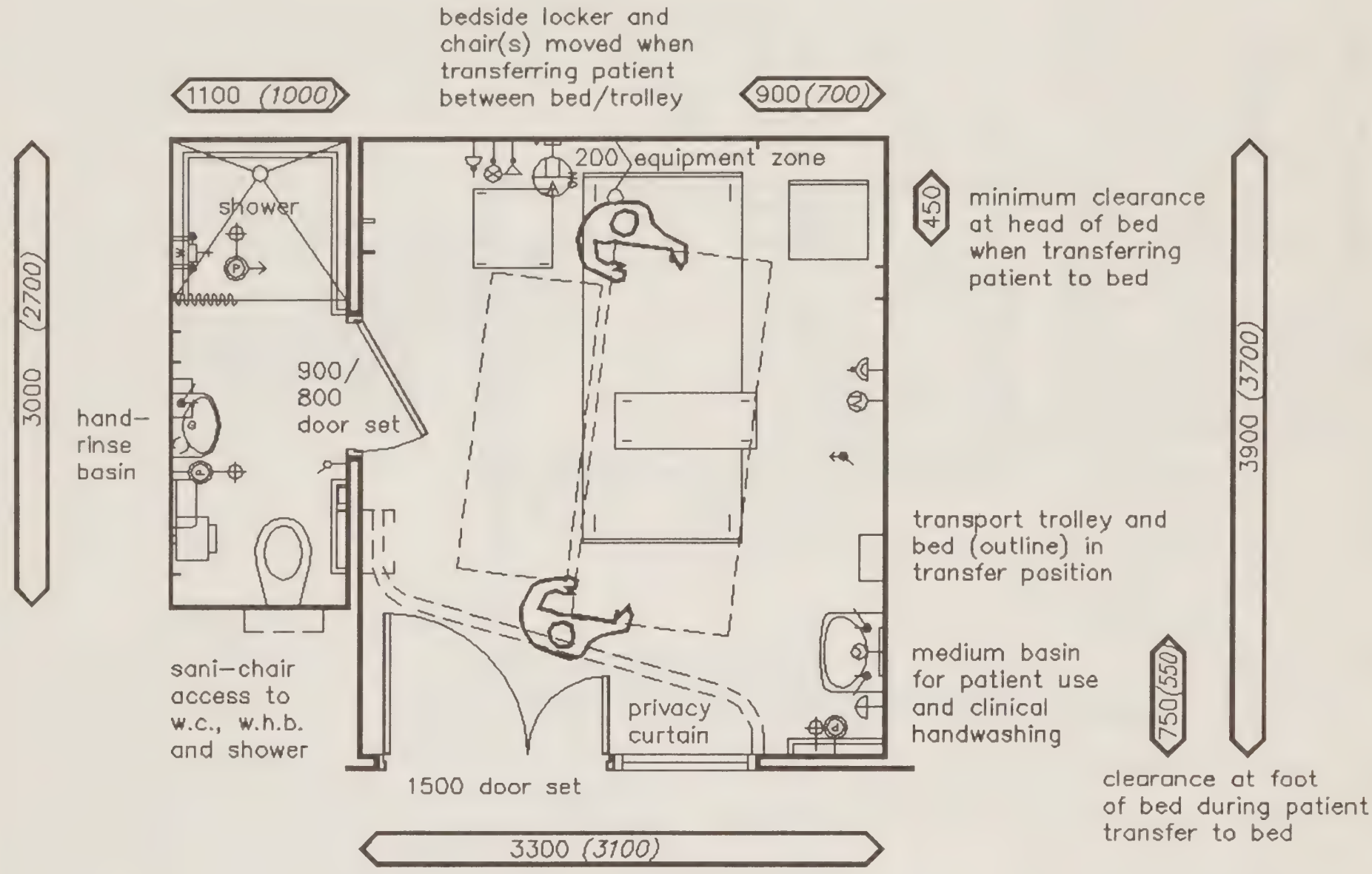
A living area which contains facilities for the patient to receive medical and nursing care in circumstances when it is desirable to segregate the patient from the main body of the ward

Activity space example layout not to scale

Single bed room

with en-suite sanitary facilities

Patient accommodation


bedside locker and chair(s) moved when transferring patient between bed/trolley
1100 (1000)
900 (700)
3000 (2700)
shower
200 equipment zone
450
minimum clearance at head of bed when transferring patient to bed
3900 (3700)
900/ 800 door set
hand- rinse basin
transport trolley and bed (outline) in transfer position
medium basin for patient use and clinical handwashing
750 (550)
sani-chair access to w.c., w.h.b. and shower
privacy curtain
1500 door set
clearance at foot of bed during patient transfer to bed
3300 (3100)

3300 (3100)

preferred minimum

Restricted minimum (recommended only in limited circumstances: see explanatory notes)

Activities

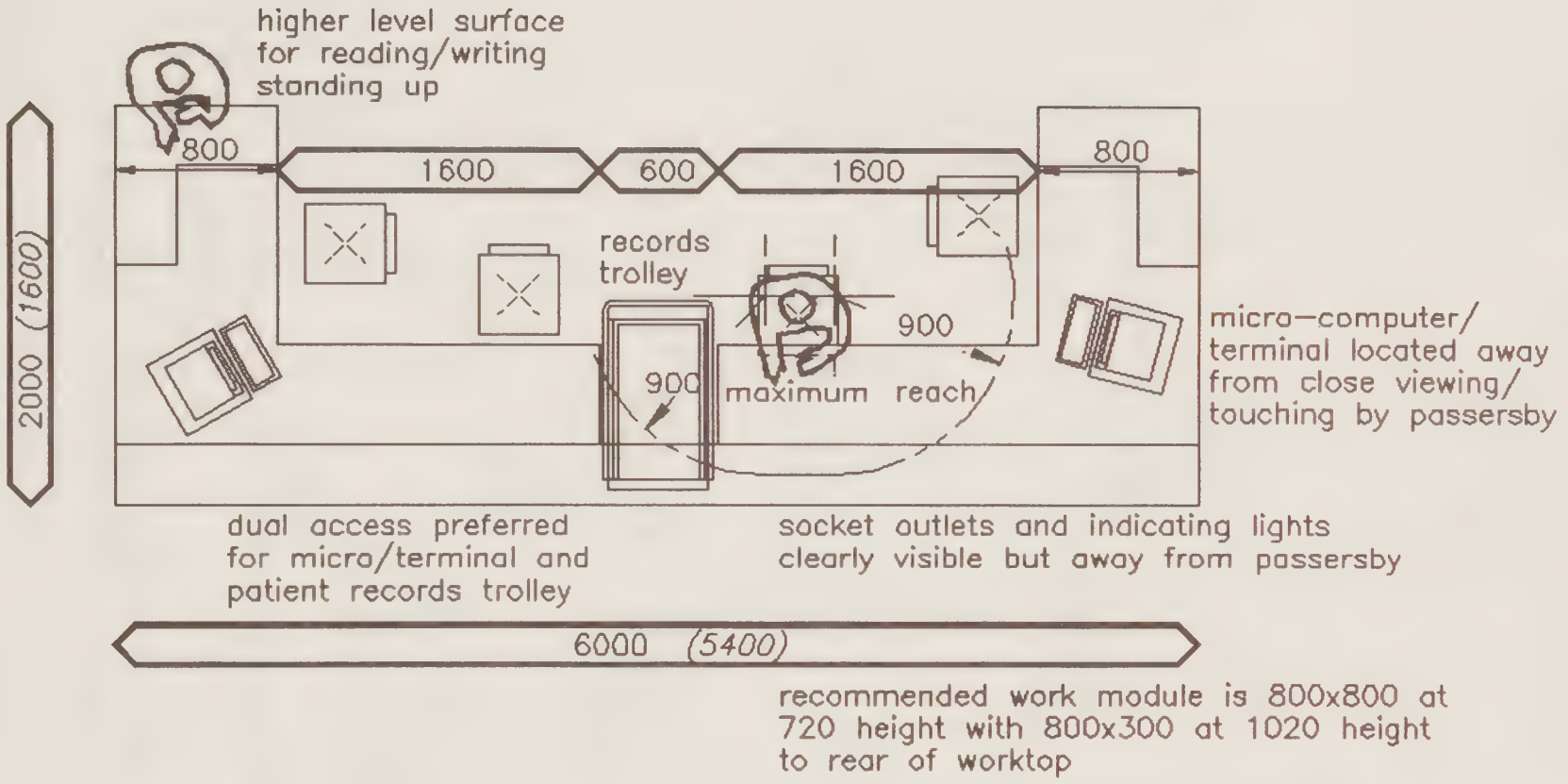
Nursing, administrative and communication centre for any ward up to 28 beds (with modifications possible to accommodate speciality requirements).

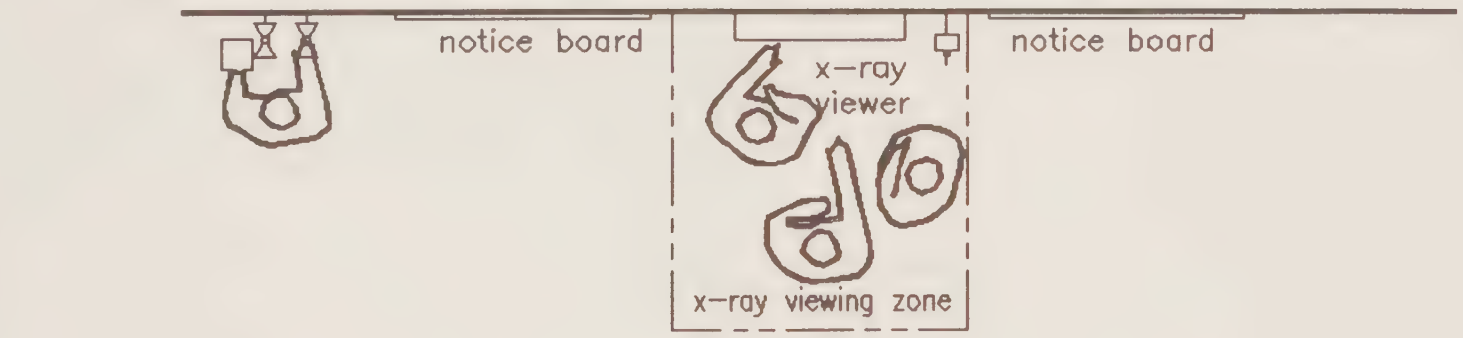
Activity space data sheet not to scale

Staff base acts as focal point to which staff, whose time is mostly spent with patients, can return to record data, issue and receive information and receive verbal and written instructions.

Staff base

Users:
male and female staff


higher level surface for reading/writing standing up
800
1600
600
1600
800
2000 (1600)
records trolley
900
900
maximum reach
micro–computer/ terminal located away from close viewing/ touching by passersby
dual access preferred for micro/terminal and patient records trolley
socket outlets and indicating lights clearly visible but away from passersby
6000 (5400)
recommended work module is 800x800 at 720 height with 800x300 at 1020 height to rear of worktop



2000 (1600)

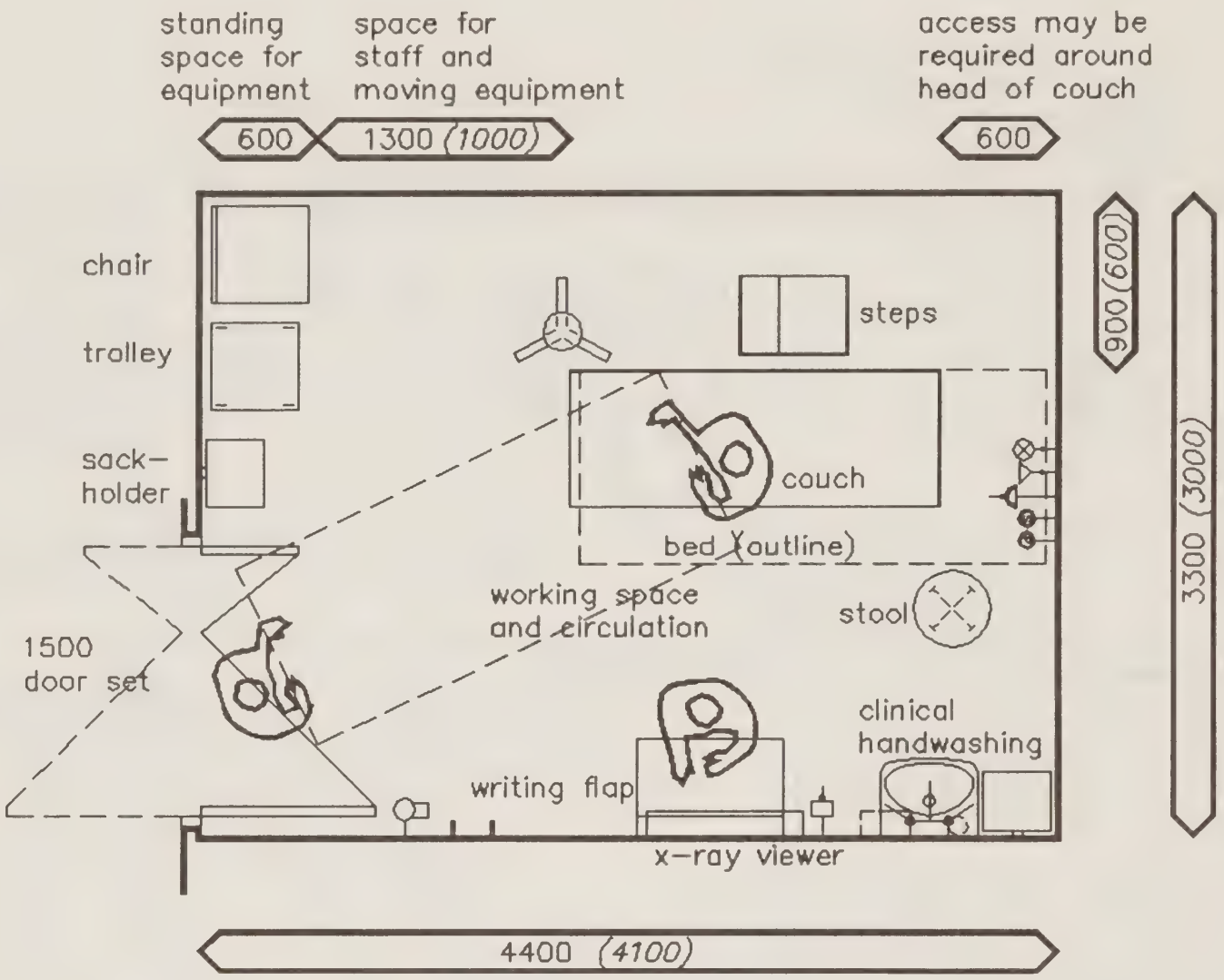
preferred minimum

Restricted minimum (recommended only in limited circumstances: see explanatory notes)

An activity space providing facilities for medical and nursing staff to perform certain clinical procedures, or for medical examination of the patient

Activity space example layout not to scale

Treatment Room



3300 (3000)

preferred minimum

Restricted minimum (recommended only in limited circumstances: see explanatory notes)

Notes

1. Treatment may be performed on patient trolley or bed, as well as on couch. When this occurs couch must be moved temporarily and parked outside the essential work/circulation space.

2. Outward opening of the door is an advantage for maneuvring within the room provided this does not obstruct circulation space outside.

Appendix 2

Calculation of Adult Acute Bed Requirements in a Proposed Hospital Scheme

The illustrative method set out below enables a project team to arrive at an estimate of the number of adult acute beds required to serve planned case loads. As an example of good practice it provides an explicit and rational link between service needs and capital investment.

The method requires that planned values be identified for the following:

a. number of consultant episodes per year;

b. average length of consultant episode;

c. days per year each bed is to be available;

d. turnover interval.

These values should be derived from projections identified through the strategic service planning process. Because the values of these variables are recorded, and because the method consists of a sequence of calculations based on them, the reasoning which led to the final figure is made explicit. It is therefore available for subsequent review not only by the original team, but also by those who manage the accommodation when it is in service.

Definitions of the terms are generally those used in the (Korner) minimum data sets, except that it is assumed that day case patients will be treated in an Adult Day Care Unit, and will not therefore be included in the calculations.

Calculation

Using the information collected above the number of beds required for each specialty can be calculated using the following formula:

$$\text{No. of beds} = \frac{a \times (b + d)}{c}$$

Any existing beds which are to be retained should be deducted from this total.

NOTES:

1. If day case patients are not expected to be treated in the Adult Day Care Unit, they will occupy adult acute ward beds during their visit. In this case, the impact of day cases on bed provision must be taken into account.

2. Exclude patients whose care is accredited to the specialty under examination, but who do not receive care on the adult acute ward, such as children in specialties other than paediatrics.

3. The turnover interval is the period of time between the discharge of one patient and the admission of the next, ie when the bed is available but not occupied.

Sensitivity

These calculations are sensitive to changes in the factors used, particularly the data on length of consultant episode and turnover interval. It is therefore recommended that they are repeated using a range of values prior to a final decision being made.

Worked example

	Consultant Episodes			
	Number	*Average length*	*Days*	*Turnover interval*
	(a)	*(b)*	*(c)*	*(d)*
General Medicine	3833.00	7.90	365.00	2.00

$$\frac{3833 \times (7.90 + 2.00)}{365} = 103.96 \text{ beds}$$

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Dd.292315, 3/90, C20, 3385/4, 5673, 89558.

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First published 1990

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ISBN 0 11 321267 4